

**FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION***All sections must be addressed, or the application will be considered invalid***I. APPLICANT INFORMATION**A. Applicant Name: Clint SestrichMailing Address: Yellowstone Ranger District, 5242 HWY 89 SouthCity: Livingston State: MT Zip: 59047Telephone: (406) 823-6067 E-mail: clint.sestrich@usda.gov

B. Contact Person (if different than applicant): \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

C. Landowner and/or Lessee Name  
(if different than applicant): \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**II. PROJECT INFORMATION**A. Project Name: Eagle Creek Yellowstone Cutthroat Trout ConnectivityRiver, stream, or lake: Eagle Creek and Davis CreekLocation: Township: 9S Range: 8E; 9E Section: 12; 6Latitude: 45.072422° Longitude: -110.677125° within project (decimal degrees)County: Park

B. Purpose of Project:

Increase the viability of the Eagle Creek Yellowstone cutthroat population by restoring connectivity to the upper Eagle Creek Watershed.

## C. Brief Project Description (attach additional information to end of application):

Eagle Creek is a second-order stream located near Gardiner Montana that flows from its headwaters on the Custer Gallatin National Forest to its confluence with the Yellowstone River in Yellowstone National Park. An in-channel pond and five road culverts that have excluded these nonnative species have simultaneously fragmented YCT habitat along its 6.6 stream miles (including Davis Creek, its primary tributary). By replacing two upstream perched culverts located on upper Eagle Creek and Davis Creek with aquatic organism passage culverts, this project would increase secure YCT habitat by an additional 2.8 stream miles (147% increase) for a total of 4.7 secure stream miles (147%). Access to these upstream habitats would increase the long-term persistence of this YCT population. Funding is requested to replace one undersized, perched culvert on upper Eagle Creek and one undersized perched culvert on Davis Creek with aquatic organism passage structures meeting Forest Service stream simulation criteria. Specifically, the existing perched culverts would be replaced with sunken 10-foot wide pipe arches. The pipe arches would meet stream simulation criteria by accommodating discharge up to the 100 flood event, spanning the bankfull channel, and by having streambanks constructed through the crossings.

D. Length of stream or size of lake that will be treated: 4.7 connected stream miles

## E. Project Budget:

Grant Request (Dollars):	\$	\$87,560
Matching Dollars:	\$	\$87,790
Matching In-Kind Services:*	\$	CGNF conducted all survey, design, engineering, contracting etc.
*salaries of government employees <u>are not</u> considered matching contributions		
Total Project Cost:	\$	\$175,350

F. **Attach** itemized (line item) budget – *see budget template*

**Attach** specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete a *supplemental questionnaire*. (<http://fwp.mt.gov/fwpDoc.html?id=36110>)

H. **Attach** land management & maintenance plans that will ensure protection of the reclaimed area.III. **PROJECT BENEFITS** (attach additional information to end of application):

A. What species of fish will benefit from this project?

Yellowstone Cutthroat Trout, *Oncorhynchus clarkii bouvieri*. Montana State Fish and Montana Species of Special Concern.

B. How will the project protect or enhance wild fish habitat?

By replacing two impassable culverts with aquatic organism passage culverts on Eagle and Davis Creeks, this project would provide wild Yellowstone cutthroat trout access to an additional 2.8 miles of suitable habitat. Thus the amount of aquatic habitat in Eagle Creek that is secure from nonnative salmonids would increase from just 1.9 stream miles to 4.7 stream miles (147% increase).

C. Will the project improve fish populations and/or fishing? To what extent?

The project is expected to more than double the amount of secure habitat in the Eagle Creek drainage for Yellowstone cutthroat trout. Once the aquatic organism passage culverts are installed, the Yellowstone cutthroat trout population will expand upstream into suitable habitat that is currently unoccupied. Increased distribution of Yellowstone cutthroat trout in the watershed will correspond with increased abundance as fish utilize newly available spawning and rearing habitat. Increased distribution and abundance are generally associated with increased population viability against genetic bottlenecks and stochastic events like fire and floods. Because there are no system trails in the upper Eagle or Davis Creek drainages, a significant increase in fishing opportunity is not expected. However, fisher-people are likely to fish the readily accessible reaches of Eagle Creek and Davis Creek immediately above the newly constructed aquatic organism passage culverts (see below).

D. Will the project increase public fishing opportunity for wild fish and, if so, how?

Because Eagle and Davis Creek are small first/second order streams, they likely appeal to a small contingent of anglers who enjoy the solitude of pursuing 6-8 inch-long, wild Yellowstone cutthroat with light tackle in frequent step-pools.

Because much of upper Eagle Creek is in steep forested terrain with no system trails, increased opportunities for catching native Yellowstone cutthroat trout would be those in close proximity to the Eagle Creek Road (Figure 1 Below):

- the 1/2 mile-long reach of Eagle Creek that parallels within 1/4 mile of the Eagle Creek Road NFSR# 3243. Anglers would walk about 1/4 mile across a gently sloping hillside meadow from one of several existing pullouts.
- The 1/4 mile-long reach of Davis Creek that can be accessed from walking upstream from the Davis Creek NFSR# 3243 crossing. A pullout that can accommodate up to four vehicles is located within 100 yards of the crossing.

In total, the project would result in about 3/4 mile increase in fishable stream within 1/4 mile of a road. Because, the project is located within four miles of the Eagle Creek Campground and within six miles of the community of Gardiner, the project is expected to result in a small increase in use by small-stream anglers.



**Figure 1.** Location of stream reaches with restored YCT connectivity that are likely to provide recreational fishing opportunity.

- E. The project agreement includes a 20-year maintenance commitment. Please discuss your ability to meet this commitment.

The Eagle and Davis Creek AOPs are located on National Forest System Road #3243, which is open seasonally to highway-legal motor vehicles for access to four additional spur roads. The Custer Gallatin National Forest is committed to maintaining this road to its designated standard as specified in the 2006 Travel Management Plan. This includes maintaining stream crossings for their intended purpose of providing for public safety, conveying flows, and providing aquatic organism passage. Aquatic organism passage structures have a relatively long lifespan (50-100 years) with minimal need for maintenance because they are designed to span beyond the bankfull channel and convey flows up to the 100-year event. The Custer Gallatin National Forest has been installing AOPs for many years and repairing upstream and downstream grade controls damaged by large-flood events, (an infrequent occurrence) is the most common maintenance need.

- F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?

Installation of undersized, perched culverts many years ago on upper Eagle Creek and Davis Creek fragmented aquatic habitat by preventing upstream movement of Yellowstone cutthroat trout into the upper watershed. Over time, lack of connectivity likely resulted in the small, isolated headwater tributaries becoming fishless. To correct the cause of degradation this project will replace the existing perched culverts with sunken 10-foot- wide pipe arches. The pipe arches would meet stream simulation criteria by accommodating discharge up to the 100 flood event, spanning the bankfull channel, and by having streambanks constructed through the crossing. Rock grade controls extending through the crossing will maintain long-term structural stability while creating frequent resting pools for fish.

- G. What public benefits will be realized from this project?

Collectively with other ongoing Yellowstone cutthroat trout conservation actions this project helps ensure the long-term viability of this native species in the Upper Yellowstone Geographic Management Unit and prevent future listing under the Endangered Species Act. Yellowstone cutthroat trout are pursued by anglers and wildlife viewers alike and fill an ecological niche by providing food to a variety of carnivores. On several occasions, local residents, who benefit directly or indirectly from Yellowstone cutthroat trout fishing, have told me, "You can't catch Yellowstone cutthroat trout just anywhere." Located within six miles of the community of Gardiner, this project provides an opportunity for place-based education about native fish conservation in the Gardiner School System as part of the Watershed Warriors Program.

- H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No, all project activities will occur on National Forest System lands. Installation of two aquatic organism passage culverts will have no effect on stream discharge or adjacent property rights.

- I. Will the project result in the development of commercial recreational use on the site? (explain):

Eagle Creek is a small stream in the front-country relatively close to Gardiner Montana and it is unlikely that commercial recreational uses such as guided fishing trips would occur as a result of this project.

- J. Is this project associated with the reclamation of past mining activity?

No

**Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.**

#### IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:



Date:

11/25/19

Sponsor (if applicable):

**Submittal: Applications must be *signed and received before December 1 and June 1* of each year to be considered for the subsequent funding period. Late or incomplete applications will be rejected.**

Mail to: Montana FWP  
Fish Management Bureau  
PO Box 200701  
Helena, MT 59620-0701

Email: Michelle McGree  
[mmcgree@mt.gov](mailto:mmcgree@mt.gov)  
(electronic submissions must be signed)  
For files over 10MB, use <https://transfer.mt.gov>

*Applications may be rejected if this form is modified.*

## Eagle Creek Yellowstone Cutthroat Trout Connectivity Project Narrative

### Project Overview

Eagle Creek is a small second-order stream located near Gardiner Montana that flows from its headwaters on the Custer Gallatin National Forest to its confluence with the Yellowstone River in Yellowstone National Park (Figure 1). It is one of just four Yellowstone River tributaries in the Gardiner Basin that support Yellowstone cutthroat trout (YCT) conservation populations having upstream reaches secure from nonnative brook trout competition and rainbow trout hybridization. An in-channel pond and five road culverts have excluded these nonnative species while simultaneously fragmenting YCT habitat along Eagle Creek's 6.6 stream miles.



**Figure 2.** Map of Eagle Creek showing locations of culverts and eDNA brook trout DNA detection. Nonnative brook trout distribution is shown in red. The community of Gardiner Montana can be seen in the lower left side of the image.

Environmental DNA sampling and electrofishing have confirmed that there are only 1.9 stream miles occupied by YCT above a barrier culvert that is excluding nonnative brook trout from upstream YCT habitat (labeled Middle Eagle Creek in Figure 1). The upstream distribution of YCT beyond this short 1.9 mile-long reach is limited by two perched culverts located on upper Eagle Creek and Davis Creek. This is because the culverts are perched sufficiently high enough above the streambed that YCT cannot jump into them and swim through (Photo 1). Electrofishing in both streams confirmed

that they are fishless. This is likely due to limited length of habitat and prolonged lack of connectivity to the downstream source population.

A qualitative survey of fish habitat suitability was conducted in upper Eagle Creek and Davis Creek upstream from the proposed AOP projects in the Spring of 2019 during runoff and in the Fall of 2019 under baseflow conditions. It was determined that there was enough habitat of sufficient quality in both streams to support Yellowstone cutthroat trout spawning, rearing, and overwintering if connectivity were restored. Wetted channel length in both streams corresponded well with mapped channel length. As expected, habitat suitability decreased in an upstream direction as stream gradient increased and flow decreased. However, other than in the uppermost reaches of both streams, neither gradient, lack of flow, nor bedrock features would preclude upstream fish passage. Both streams were largely dominated by the moderate gradient Rosgen B channel type with cobble and gravel-sized substrate. These reaches typically had frequent scour and dam pools created by abundant large woody debris. Gravel of suitable size for spawning was frequently present in pool tail-outs. Inclusions of the Rosgen A channel type occur in locations where the valley width and floodplain narrow and gradient increases. Habitat in these reaches was characterized by high gradient riffles, cobble and large-woody debris-formed step pools, and small cascades. Channels and streambanks were stable overall with little erosion or evidence of incision. Riparian areas of both streams are healthy and dominated by a dense conifer overstory (primarily englemann spruce and douglas fir). The understory vegetation varies with canopy cover from sparse sedge, grass, forbs, and moss to dense woody shrubs (mountain maple, alder, and willow).



**Photo 1.** Much of upper Eagle Creek is comprised of moderate gradient habitat with stable banks and abundant large woody debris which provides overhead cover and contributes to frequent scour and dam pools.



**Photo 2.** Davis Creek upstream from the proposed AOP project is moderate in gradient with stable banks and abundant large woody debris-formed scour pools with tail-outs providing suitable spawning habitat (right photo).

### **Project Objective**

Funds from partner agencies will be allocated to replace the two perched culverts on upper Eagle Creek and Davis Creek (Photo 1) with aquatic organism passage structures (AOPs). These AOPs would restore YCT access to an additional 2.8 miles of suitable habitat (147% increase) in the upper watershed for a total of 4.7 stream miles secure from nonnative fish. Access to these upstream habitats would increase the distribution and abundance of YCT in Eagle Creek thus increasing the potential for long-term persistence of this conservation population.

The AOPs have been designed to pass 100-year flood events while meeting other Forest Service stream simulation criteria (see attached specs and drawings). Specifically, the AOPs will be 10-foot wide, channel-spanning pipe arches, countersunk to allow construction of streambed and banks within. Rock grade controls extending through the structures would maintain long-term stream channel stability while providing frequent resting pools for fish.



**Photo 3.** View looking upstream at the perched outlets of the existing culverts on Eagle Creek (left) and Davis Creek (right). The degree to which these culverts are undersized is illustrated by the wide width of the stream relative to the narrow width of the culverts.

### **Strategic Fit and Geographic Importance**

The Custer Gallatin National Forest, Montana Fish, Wildlife and Parks, and Yellowstone National Park are working collaboratively to conserve Yellowstone cutthroat trout populations in the upper Yellowstone River Drainage. YCT conservation in the Upper Yellowstone requires a two-pronged strategy comprised of maintaining connectivity to spawning tributaries for fluvial YCT in the Yellowstone River while securing resident headwater populations from competition and hybridization with nonnative salmonids. Eagle Creek supports one such resident population identified as a conservation population in the Yellowstone Cutthroat Trout Conservation Strategy for Montana (<http://fwp.mt.gov/fishAndWildlife/management/yellowstoneCT/#montana>) and the YCT status assessment (<http://fwp.mt.gov/gis/maps/yctAssessment/>). According to the Strategy (page 35), “conservation planning for Eagle Creek should include improving connectivity by replacing perched culverts.” The Strategy lists Habitat Restoration Action 4.4 Connectivity (page 17): “Fragmentation of habitats presents a significant threat to the persistence of isolated populations of Yellowstone cutthroat trout. Features that limit connectivity include impassable culverts at road crossings and irrigation diversions. Eliminating these fish passage barriers, where warranted, will be an important component of Yellowstone cutthroat trout conservation in the planning area.”

Geographically, this project is important because Eagle Creek is only one of four Yellowstone River tributaries in the Gardiner Basin with headwater resident populations secure from competition and hybridization with nonnative fish. Located within six miles of the community of Gardiner, this project provides an opportunity for place-based education about native fish conservation in the Gardiner School System as part of the

**Watershed Warriors Program.****Monitoring Success**

Project success will be evaluated through implementation of a five-year monitoring plan.

**Goal:**

Document the effectiveness of restored connectivity to upper Eagle and Davis Creek for Eagle Creek Yellowstone cutthroat trout.

**Objectives:**

1. Monitor length of occupied habitat in reconnected stream reaches annually over five years.
2. Monitor reproductive success annually for five years in reconnected stream reaches.
3. Monitor densities of YCT in three discrete long-term monitoring reaches annually for five years.
4. Monitor structural integrity and functionality of new AOPs annually during high and low flow for two years and then intermittently over the life span of the structures (50 years).

**Methods by Objective:**

- 1: Conduct continuous presence absence electrofishing at base-flow in August or September to determine upstream YCT distribution in Eagle and Davis Creek each year for five years. Record shocking time, captured fish lengths, and start and end coordinates.
- 2: Document size, abundance, and location of young-of-year fish concurrently with objective 1.
- 3: Establish and monument three 100 meter-long electrofishing reaches located on middle Eagle Creek, Upper Eagle Creek, and Davis Creek. Conduct electrofishing depletion estimates annually for each of five years after AOP installation.
- 4: Conduct site visits during spring high flow and fall low flow to ensure that each structure is fully functioning. Inspection items include stability and passage of rock weirs/grade controls, stability of bank materials, sufficient flow through structure during baseflow conditions to facilitate passage.

**Results:**

After completion of the five-year monitoring period a monitoring report addressing each monitoring objective will be generated and shared with project partners.

**Project Timeline**

Survey and design are already completed for this project. Next steps include securing and obligating remaining funding (October 2019-June 2020), awarding

contract (June-July 2020), implementing contract (July to September 2020), revegetation by USFS personnel (June 2021). Environmental compliance for Forest Service AOP projects is covered programmatically under a NEPA Categorical Exclusion: Categories of actions for which a project and case file and decision memo are not required: Repair and maintenance of roads, trails, and landline boundaries...36 CFR 220.6(d)(4). See [http://www.fs.fed.us/cgi-bin/Directives/get\\_dirs/fsh?1909.15](http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?1909.15) Because this project will require ground disturbance, archaeology and sensitive plant surveys will be conducted and clearances acquired prior to awarding the contract.

Both tables must be completed or the application will be returned

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel***								
Survey	4	days	\$375.26	\$ 1,501.04				\$ -
Design	2	days	\$431.38	\$ 862.76				\$ -
Engineering	8	days	\$431.38	\$ 3,451.04				\$ -
Permitting	2	days	\$431.38	\$ 862.76				\$ -
Oversight	7	days	\$375.26	\$ 2,626.82				\$ -
				\$ -				\$ -
		Sub-Total		\$ 9,304.42	\$ -	\$ -	\$ -	\$ -
Travel								
Mileage	1280	miles	\$0.20	\$ 256.00				\$ -
Per diem				\$ -				\$ -
		Sub-Total		\$ 256.00	\$ -	\$ -	\$ -	\$ -
Construction Materials****								
	1,864.00	Embankment (CY)	16.50	\$ 30,756.00			30,756.00	\$ 30,756.00
	2,598.00	Excavation (CY)	11.00	\$ 28,578.00			28,578.00	\$ 28,578.00
	801.00	Structure Backfill (CY)	22.00	\$ 17,622.00	17,622.00			\$ 17,622.00
	40.00	Bedding (CY)	60.50	\$ 2,420.00	2,420.00			\$ 2,420.00
	20.00	Foundation Fill (CY)	60.50	\$ 1,210.00	1,210.00			\$ 1,210.00
	30.00	Class 4 Inlet Riprap (CY)	82.50	\$ 2,475.00	2,475.00			\$ 2,475.00
	86.00	Class 5 Riprap Inside Culvert (CY)	110.00	\$ 9,460.00	9,460.00			\$ 9,460.00
	90.00	Class 6 Riprap in Grade Control (CY)	82.50	\$ 7,425.00	7,425.00			\$ 7,425.00
	63.00	Weir Boulders inside culvert (EachJ)	110.00	\$ 6,930.00	6,930.00			\$ 6,930.00
	20.00	Salvaged Streambed Material inside culvert (CY)	66.00	\$ 1,320.00	1,320.00			\$ 1,320.00
	90.00	Surface Course Aggregate (CY)	66.00	\$ 5,940.00	5,940.00			\$ 5,940.00
	1.00	128" x 83" x 80' Pipe Arch Culvert (12 Guage; LSQ)	14,260.40	\$ 14,260.40	14,260.40			\$ 14,260.40
	1.00	128" x 83" x 68' Pipe Arch Culvert (12 Guage; LSQJ)	13,877.60	\$ 13,877.60	13,877.60			\$ 13,877.60
		Sub-Total		\$ 142,274.00	\$ 82,940.00	\$ -	\$ 59,334.00	\$ 142,274.00
Equipment and Labor								
	2.00	Construction Survey/Staking (LSQ)	3,300.00	\$ 6,600.00			6,600.00	\$ 6,600.00
	2.00	Soil Erosion Control (LSQ)	2,200.00	\$ 4,400.00			4,400.00	\$ 4,400.00
	2.00	Clearing and Grubbing (LSQ)	2,200.00	\$ 4,400.00			4,400.00	\$ 4,400.00
	2.00	Removal and Disposal of Existing Culvert (LSQ)	1,100.00	\$ 2,200.00	2,200.00			\$ 2,200.00
	40.00	Constructed Streambank (LF; includes riprap, wattles, stakes, installation, and salvage/placement of native streambed materials)	26.40	\$ 1,056.00			1,056.00	\$ 1,056.00
	8.00	Rental Equipment (HR)	159.50	\$ 1,276.00	1,276.00			\$ 1,276.00
	16.00	General Labor (HR)	71.50	\$ 1,144.00	1,144.00			\$ 1,144.00
		Sub-Total		\$ 21,076.00	\$ 4,620.00	\$ -	\$ 16,456.00	\$ 21,076.00
Mobilization								
	2	Equipment Mobilization (Reflects economy of scale)	\$6,000.00	\$ 12,000.00			12,000.00	\$ 12,000.00
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
		Sub-Total		\$ 12,000.00	\$ -	\$ -	\$ 12,000.00	\$ 12,000.00

<b>TOTALS</b>	\$	184,910.42	\$	87,560.00	\$	-	\$	87,790.00	\$	175,350.00
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**OTHER REQUIREMENTS:**

**All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid.** Please see the example budget sheet for additional clarification.

\*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

\*\*Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used for calculations). Describe here or in text.

Reminder: Government salaries cannot be used as in-kind match

\*\*\*The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a minimum of two competitive bids for the cost of undertaking the project.

\*\*\*\*The Review Panel recommends a maximum fencing cost of \$1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

**MATCHING CONTRIBUTIONS** (do not include requested funds)

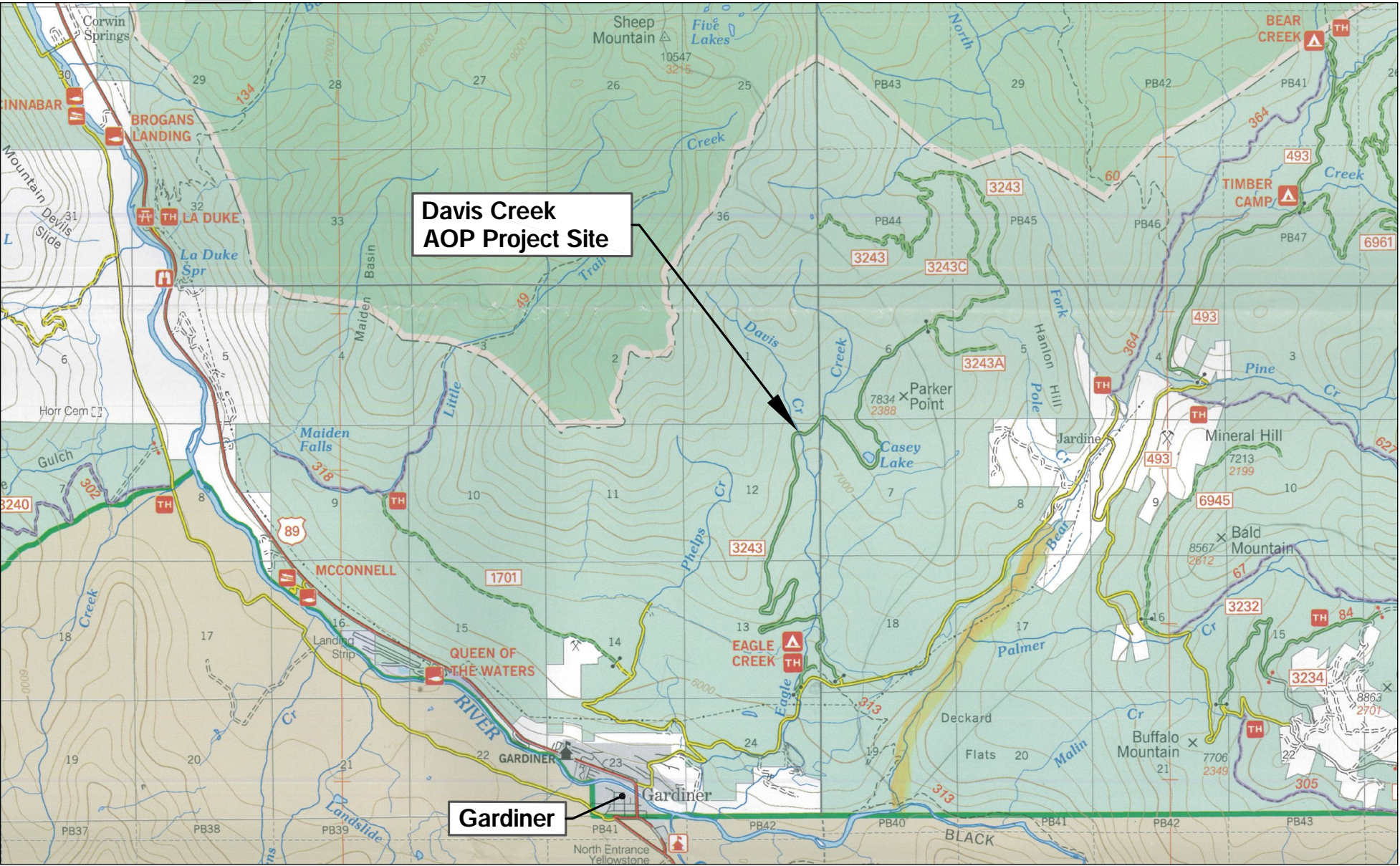
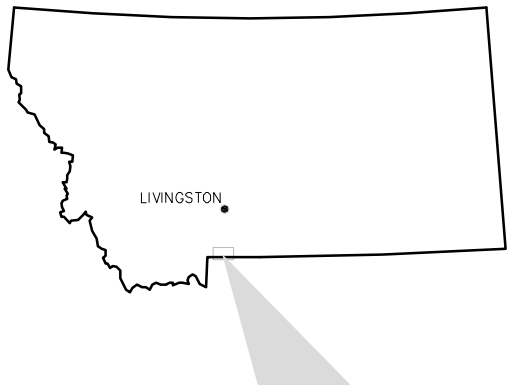
CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
US Fish and Wildlife Service Fish Passage	\$ -	\$ 32,500.00	\$ 32,500.00	Y
Western Native Trout Initiative	\$ -	\$ 48,467.00	\$ 48,467.00	N
USDA Forest Service	\$ -	\$ 6,823.00	\$ 6,823.00	N
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
<b>TOTALS</b>	\$ -	\$ 87,790.00	\$ 87,790.00	32500

CONSTRUCTION PLANS FOR

**DAVIS CREEK**

**AQUATIC ORGANISM PASSAGE (AOP) CULVERT**

Custer Gallatin National Forest  
Gardiner Ranger District



VICINITY MAP

SHEET INDEX

SHEET	TITLE
1	COVER
2	SITE PLAN AND GENERAL NOTES
3	LONGITUDINAL PROFILE AND CULVERT ENDS
4	STREAMBED DETAILS
5	GRADE CONTROL DETAILS
6	ROAD DETAILS

RECOMMENDED

DESIGN ENGINEER

DATE

DISTRICT RANGER

DATE

APPROVED

I CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE LAND USE PRESCRIPTIONS FOR THE AREA AND WITH SOUND ENGINEERING PRACTICE AND APPROVE IT FOR CONSTRUCTION.

FOREST ENGINEER

DATE

FOREST SUPERVISOR

DATE

GENERAL NOTES

1. **GEOTECHNICAL INVESTIGATION.** A GEOTECHNICAL INVESTIGATION HAS NOT BEEN CONDUCTED AT THE PROJECT SITE.
2. **SPECIFICATIONS.** MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03 (U.S. CUSTOMARY UNITS) AND THE SUPPLEMENTAL SPECIFICATIONS INCLUDED IN THE CONTRACT.
3. **MATERIAL QUANTITIES.** ESTIMATED QUANTITIES ARE PROVIDED FOR INFORMATION ONLY. CONTRACTOR TO VERIFY QUANTITIES.
4. **DEWATERING AND EROSION CONTROL.** DEWATER AND PROTECT AGAINST SOIL EROSION AND SEDIMENTATION DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 157 AND PROJECT PERMITS. PREPARE AND SUBMIT A DEWATERING AND EROSION CONTROL PLAN TO C.O. FOR APPROVAL. GROUND DISTURBING WORK SHALL NOT COMMENCE UNTIL DEWATERING AND EROSION CONTROL PLAN HAS BEEN APPROVED IN WRITING BY THE C.O.

CONTRACTOR SHOULD ANTICIPATE WATER INFILTRATING INTO EXCAVATIONS AND SHALL REMOVE WATER AS NECESSARY TO COMPLETE THE WORK (INCLUDING BUT NOT LIMITED TO MATERIAL PLACEMENT AND COMPACTION) IN ACCORDANCE WITH ALL CONTRACT REQUIREMENTS.

WORK WITHIN THE STREAM CHANNEL SHALL OCCUR ONLY WHILE THE CHANNEL IS COMPLETELY DEWATERED.

APPROVAL OF THE CONTRACTOR'S DEWATERING AND EROSION CONTROL PLAN BY THE C.O. DOES NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO MEET ALL CONTRACT REQUIREMENTS ASSOCIATED WITH DEWATERING AND EROSION CONTROL. IF THE METHODS IDENTIFIED BY THE CONTRACTOR IN THEIR DEWATERING AND SEDIMENT CONTROL PLAN FAIL TO PROVIDE CONDITIONS UNDER WHICH SPECIFIED CONSTRUCTION RESULTS CAN BE ACHIEVED, OR FAIL TO PROVIDE ENVIRONMENTAL PROTECTION AS PRESCRIBED IN THE CONTRACT OR PROJECT PERMITS, THE CONTRACTOR SHALL RE-EVALUATE AND SUBMIT A REVISED DEWATERING AND EROSION CONTROL PLAN TO THE C.O. PREPARATION OF REVISED PLAN(S) IS INCIDENTAL TO THE WORK.

5. **CLEARING AND DISTURBANCE LIMITS.** LIMIT ALL DISTURBANCE TO WITHIN THE DESIGNATED DISTURBANCE LIMITS. CLEARING AND DISTURBANCE LIMITS ARE SHOWN ON THE PLANS AND WILL BE STAKED IN THE FIELD BY THE C.O. ADDITIONAL AREAS FOR STORAGE/STOCKPILING SHALL BE SOLELY AT THE DISCRETION OF THE C.O. AND AS APPROVED AND STAKED BY THE C.O.

TOPSOIL SHALL BE SALVAGED TO A DEPTH OF 1 FT BELOW THE SURFACE FROM ALL AREAS TO BE DISTURBED BY EXCAVATION, BACKFILL, OR MATERIAL/EQUIPMENT STORAGE/OPERATION AND SHALL BE STOCKPILED SEPARATELY FROM OTHER MATERIALS. FOLLOWING CONSTRUCTION, SALVAGED TOPSOIL SHALL BE SPREAD EVENLY OVER ALL DISTURBED SURFACES TO PROVIDE A MINIMUM 4-IN. DEEP TOPSOIL LAYER. ADJACENT DUFF (LIVE AND DEAD VEGETATION MATERIAL) SHALL BE RAKED ONTO THE DISTURBED AREAS. CONSERVING AND REPLACING TOPSOIL AND PLACING DUFF, TREES, AND SLASH IS INCLUDED IN PAY ITEM 201-01.

SALVAGE CLEAN EXISTING SURFACE COURSE AGGREGATE FROM ALL AREAS TO BE DISTURBED AND STOCKPILE FOR RE-APPLICATION TO ROAD SURFACE. RE-APPLY ONLY GRAVEL THAT HAS BEEN APPROVED FOR USE BY THE C.O. CONSERVING AND REPLACING SURFACE COURSE AGGREGATE IS INCLUDED IN PAY ITEM 204-01.

7. **CONTROL POINTS.** EXISTING CONTROL POINTS ARE SHOWN ON THE DRAWINGS. CONTRACTOR SHALL LOCATE LAYOUT POINTS IN ACCORDANCE WITH SECTION 152. SECURE C.O. APPROVAL OF SURVEYED LAYOUT POINTS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
8. **TOLERANCES.** CONTROL POINT TOLERANCES SHALL BE AS SHOWN IN SECTION 152. CONSTRUCTION TOLERANCES (X,Y,Z) SHALL BE AS FOLLOWS:

+/- 0.5 FT IN THE HORIZONTAL (X,Y) PLANE  
+/- 0.1 FT VERTICAL (Z)

DIMENSIONS (E.G., LENGTH, WIDTH, THICKNESS) SHALL BE AS SHOWN ON THE PLANS.

9. **STRUCTURE EXCAVATION.** COMPLETE STRUCTURE EXCAVATION IN ACCORDANCE WITH SECTION 208. STRUCTURE EXCAVATION INCLUDES BEDROCK EXCAVATION AND BLASTING. COMPLY WITH OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX A - SOIL CLASSIFICATION AND OSHA-EXCAVATIONS, 1926 SUBPART P, APPENDIX B - SLOPING AND BENCHING.

THE CONTRACTOR SHALL SUBMIT AN EXCAVATION PLAN TO THE C.O. FOR APPROVAL. PLAN SHALL INCLUDE DRAWINGS AND WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED EXCAVATION LIMITS, METHODS, EQUIPMENT, SHORING, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES AND SHALL COMPLY WITH OSHA EXCAVATION SOIL TYPING AND REQUIREMENTS.

STRUCTURE EXCAVATION QUANTITY SHOWN IS FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON MAXIMUM ALLOWABLE SLOPE ON EXCAVATION WALLS OF 1.5:1 (HORIZONTAL:VERTICAL). CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES BASED ON THEIR OWN EXCAVATION PLANS.

10. **STRAW WATTLE SEDIMENT BARRIERS.** INSTALL STRAW WATTLES AS SEDIMENT BARRIERS IN ALL LOCATIONS WHERE DISTURBED SOIL LIES DIRECTLY ADJACENT TO STREAMBANKS OR CHANNEL. INSTALL WATTLES ALONG THE TOPS OF STREAMBANKS AS DIRECTED BY THE C.O. PLACE WATTLES IN A 4-INCH DEEP TRENCH AND STAKE AS SHOWN IN THE DRAWINGS. WATTLES ARE NOT REQUIRED WHERE RIPRAP OR CONSTRUCTED STREAMBANKS LIE ADJACENT TO THE STREAM CHANNEL.

11. **STRAW WATTLES.** STRAW WATTLES FOR SEDIMENT BARRIERS AND CONSTRUCTED STREAMBANKS SHALL BE 9-INCH DIAMETER AND CERTIFIED WEED-FREE.

12. **THALWEG.** THE THALWEG IS DEFINED AS THE LOWEST POINT IN THE STREAM CHANNEL CROSS-SECTION.

13. **ESTIMATED QUANTITIES.** ESTIMATED QUANTITIES ARE SHOWN ON THE BID SCHEDULE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF QUANTITY ESTIMATES.

CONTROL AND LAYOUT POINT INFORMATION  
(LOCAL COORDINATES)

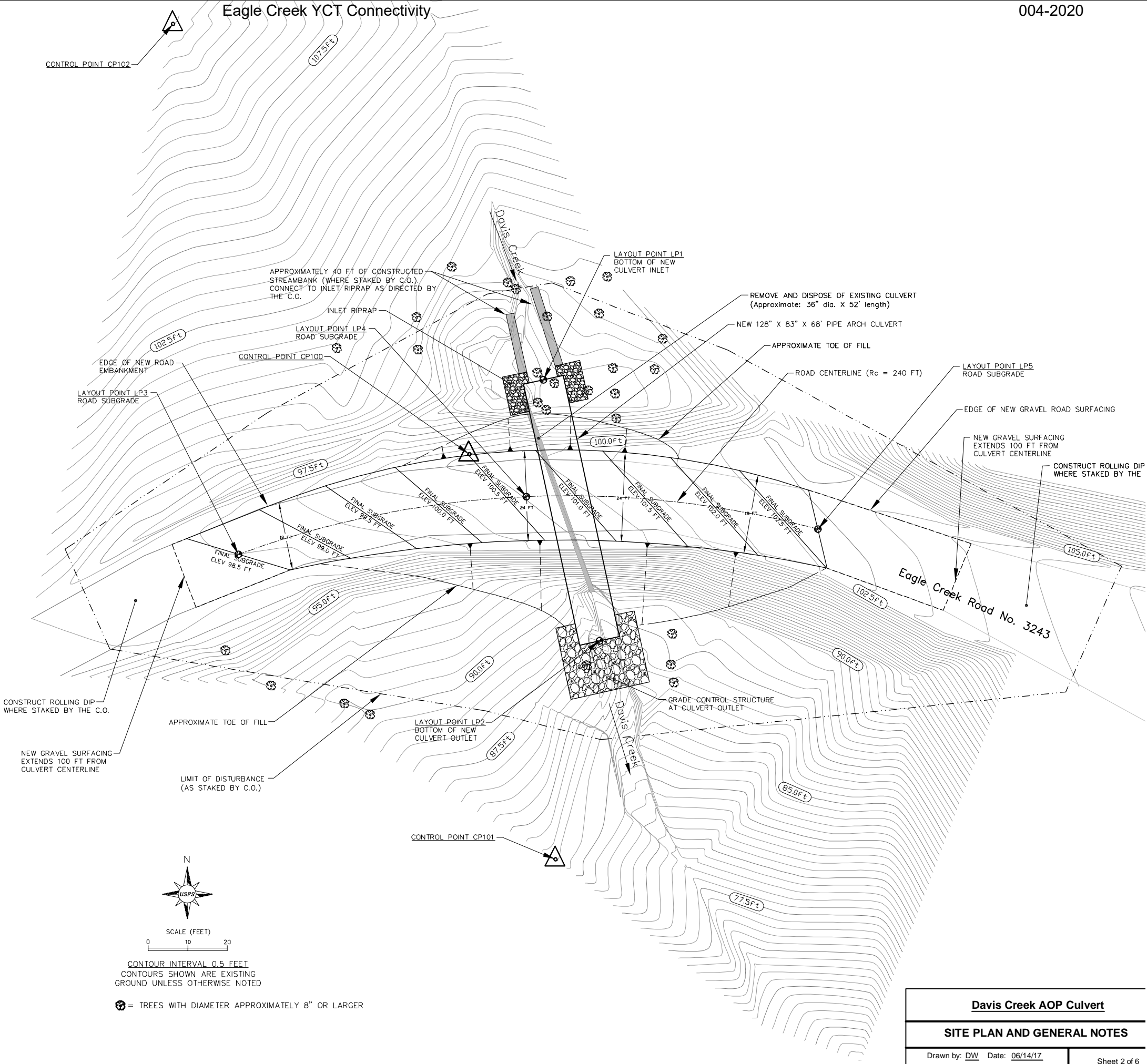
POINT	NORTHING	EASTING	ELEVATION
CP100	20000.00	40000.00	100.00
CP101	19897.42	40021.77	83.59
CP102	20108.90	39925.02	112.05
LP1	20018.81	40018.72	89.85
LP2	19952.73	40032.91	82.44
LP3	19974.64	39941.54	98.50
LP4	19989.23	40014.40	100.60
LP5	19981.03	40088.15	102.50



SCALE (FEET)  
0 10 20

CONTOUR INTERVAL 0.5 FEET  
CONTOURS SHOWN ARE EXISTING  
GROUND UNLESS OTHERWISE NOTED

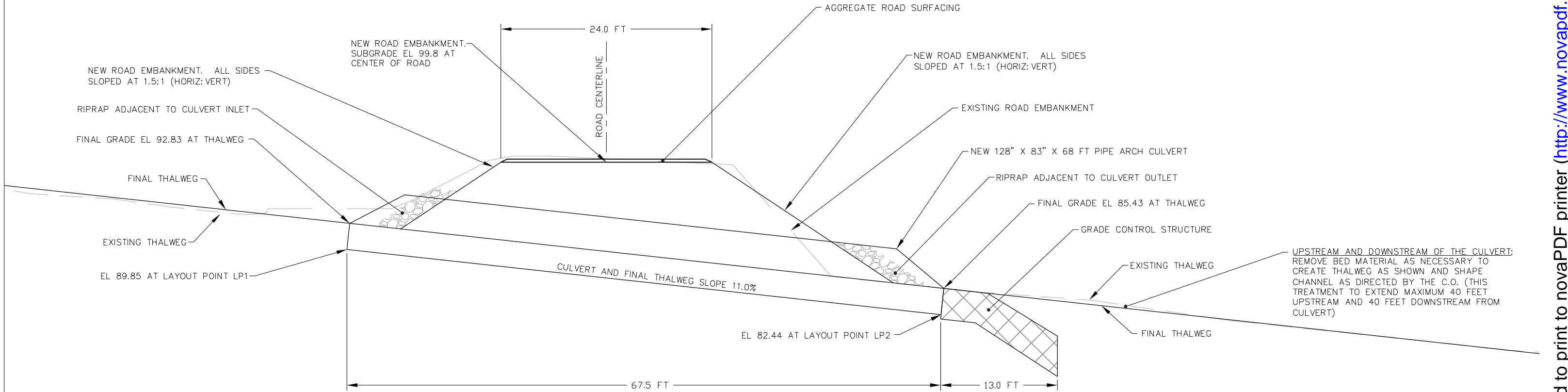
⊗ = TREES WITH DIAMETER APPROXIMATELY 8" OR LARGER



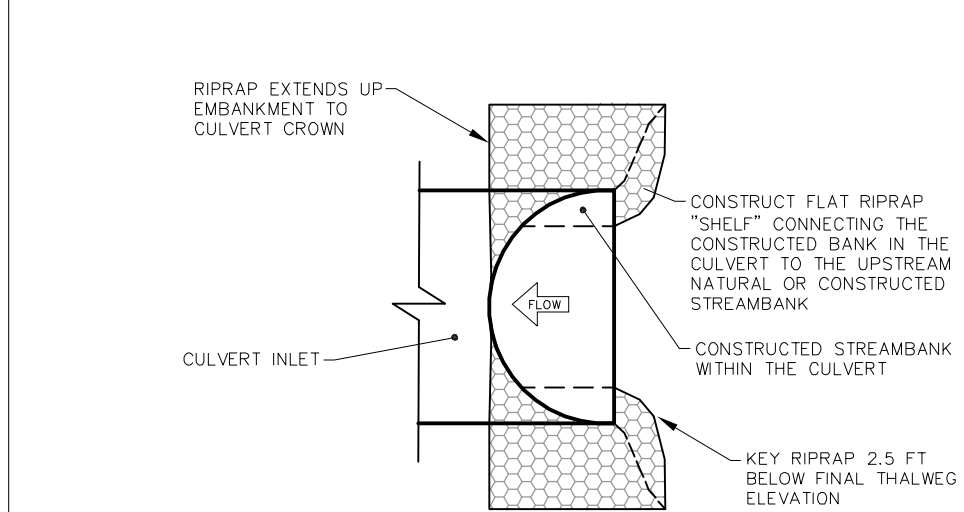
Davis Creek AOP Culvert

SITE PLAN AND GENERAL NOTES

Drawn by: DW Date: 06/14/17  
Revised: Date:

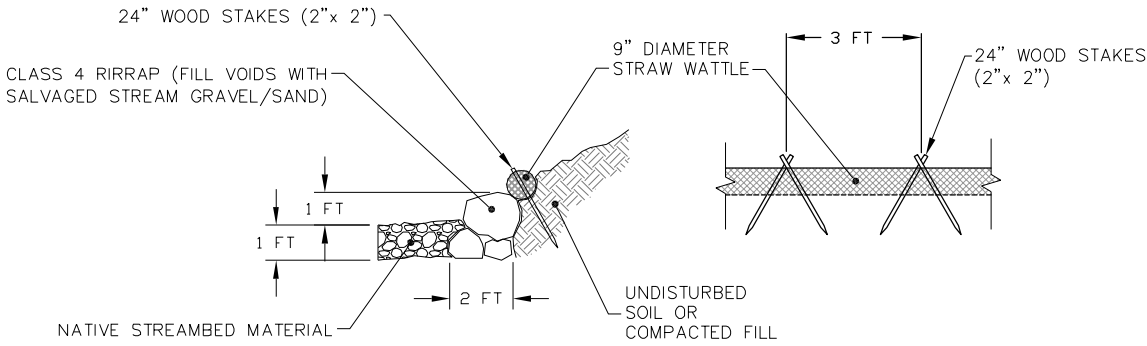


LONGITUDINAL SECTION THROUGH CULVERT  
NOT TO SCALE



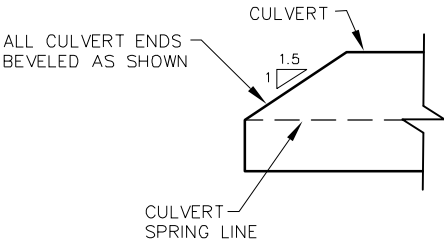
CULVERT INLET RIPRAP PLAN VIEW  
NOT TO SCALE

RIPRAP:  
INSTALL 2.0 FT THICK LAYER  
OF CLASS 4 RIPRAP (15 CY  
TOTAL PER CULVERT) WITH  
KEYED PORTION AND SHELF AS  
SHOWN



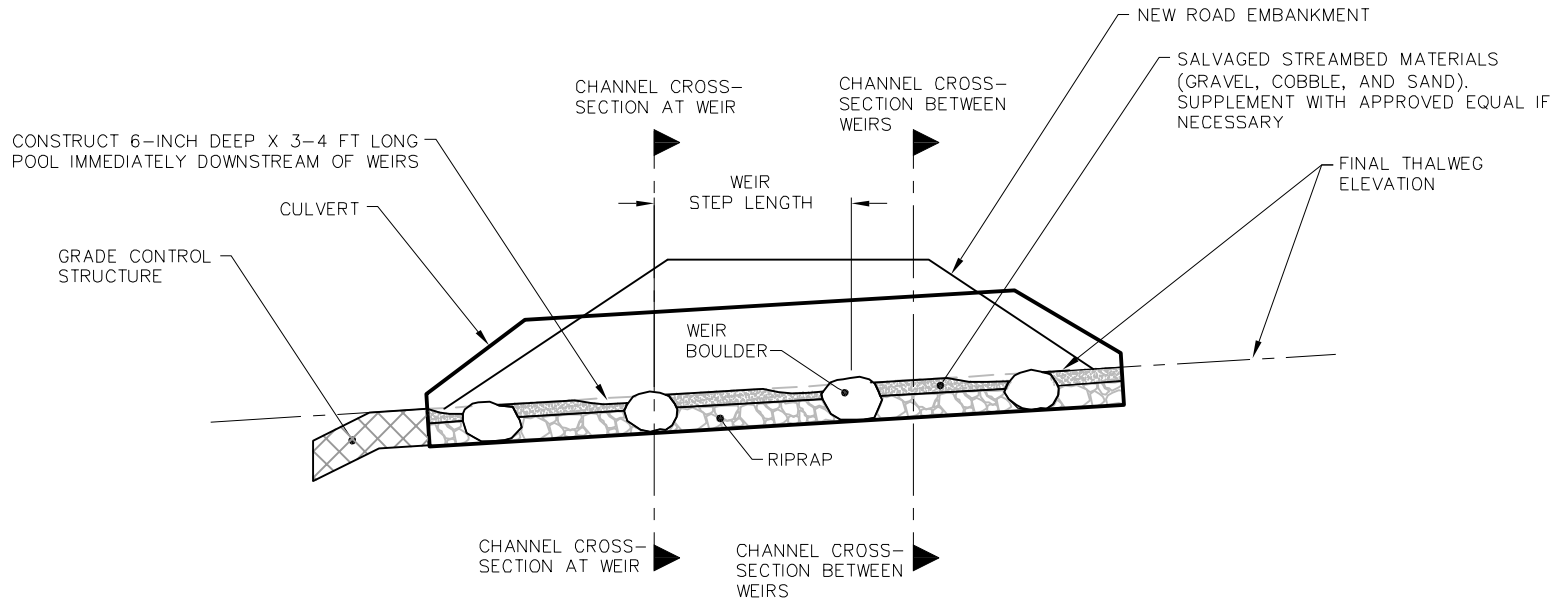
CROSS-SECTION (NOT TO SCALE) STAKING DETAIL (NOT TO SCALE)

CONSTRUCTED STREAMBANK DETAILS  
NOT TO SCALE

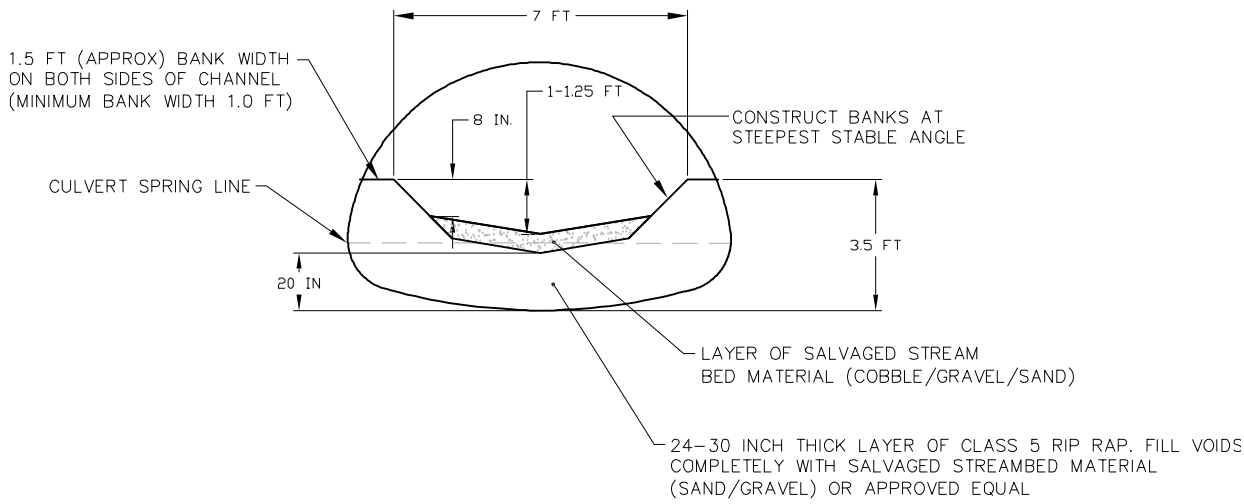


DETAIL OF CULVERT BEVELED END  
NOT TO SCALE

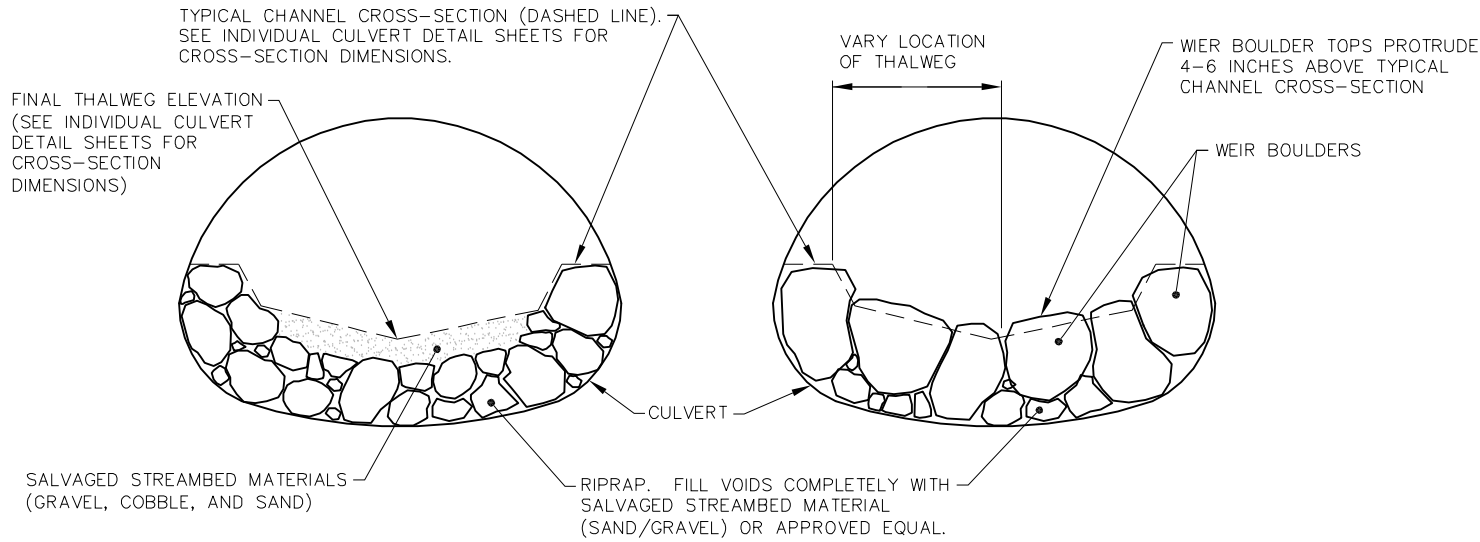
Davis Creek AOP Culvert		
LONGITUDINAL PROFILE & MISC. DETAIL		
Drawn by: DW	Date: 06/14/17	Sheet 3 of 6
Revised:	Date:	



TYPICAL LONGITUDINAL SECTION THROUGH CULVERTS  
NOT TO SCALE



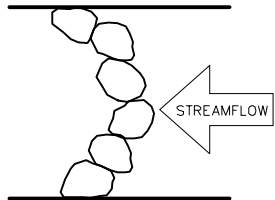
CHANNEL CROSS-SECTION DIMENSIONS AND MATERIALS WITHIN CULVERT  
NOT TO SCALE



Channel Cross-Section Between Weirs

Channel Cross-Section at Weir

CONSTRUCTED CHANNEL CROSS-SECTIONS INSIDE CULVERTS  
NOT TO SCALE



TYPICAL PLAN VIEW OF WEIR  
NOT TO SCALE

CHANNEL TOP WIDTH, WEIR BOULDER SIZE,  
GRADE CONTROL RIPRAP SIZE, AND STEP LENGTH

CHANNEL TOP WIDTH	7 FT
RIPRAP INSIDE CULVERT	CLASS 5
WEIR BOULDER SIZE*	34-40 IN.*
GRADE CONTROL RIPRAP	CLASS 6
STEP LENGTH RANGE	8-10 FT.
STEP LENGTH AVERAGE	9 FT.

\*THE SIZE SHOWN IS THE "INTERMEDIATE DIMENSION" AS DEFINED IN SECTION 101

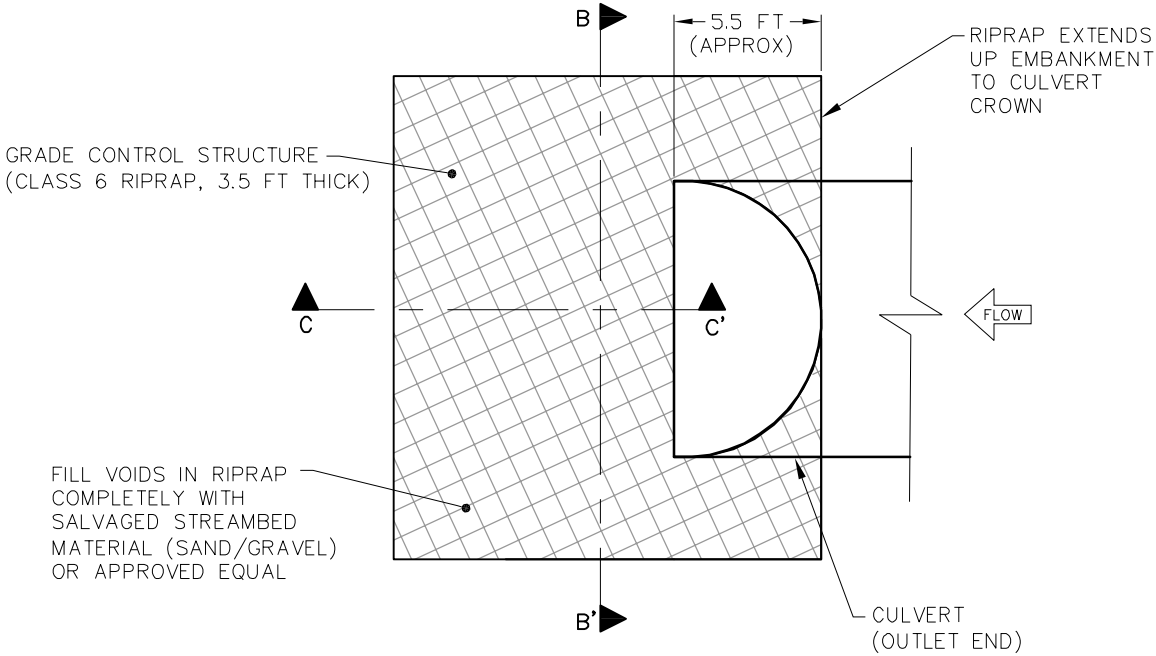
NOTE: VARY STEP LENGTH WITHIN RANGE SHOWN. ACHIEVE OVERALL AVERAGE AS SHOWN.

MATERIAL SIZES AND WEIR STEP LENGTH  
NOT TO SCALE

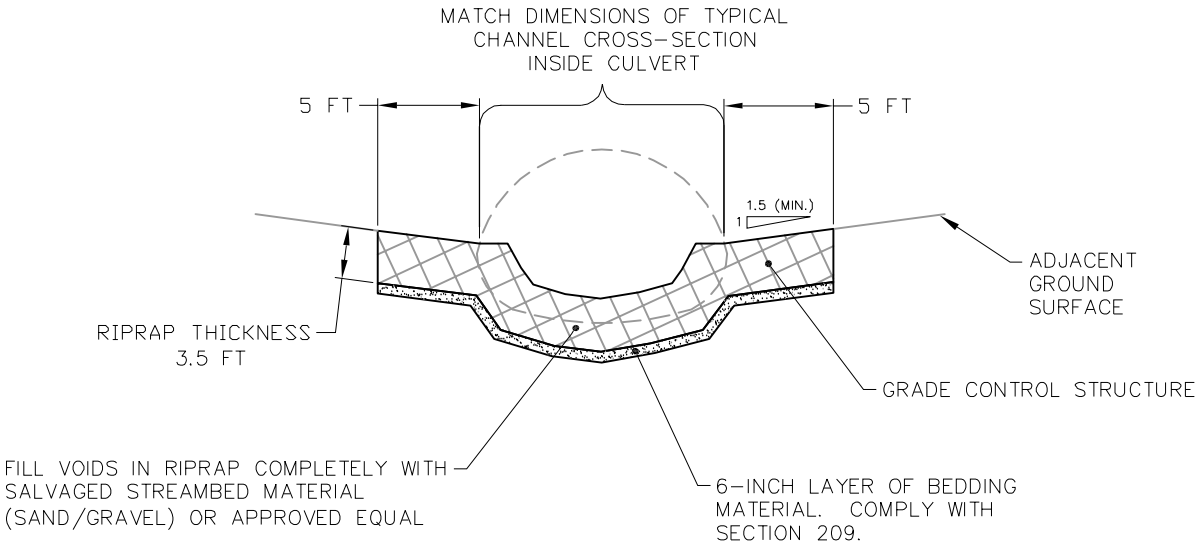
Davis Creek AOP Culvert

STREAMBED DETAILS

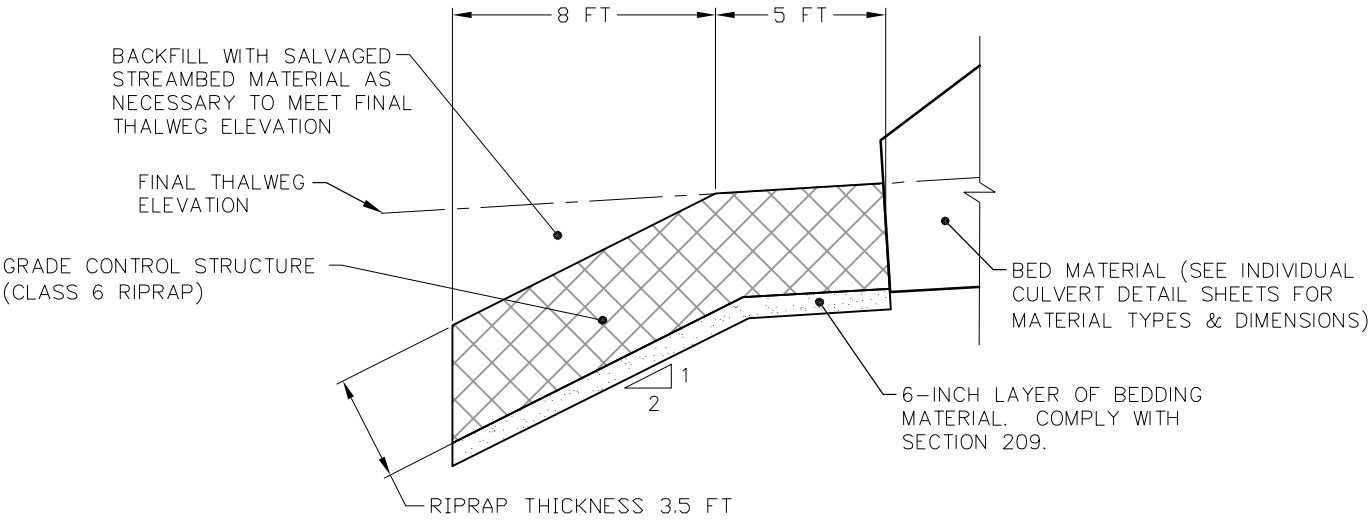
Drawn by: DW Date: 06/14/17  
Revised: Date:



GRADE CONTROL STRUCTURE PLAN VIEW  
NOT TO SCALE

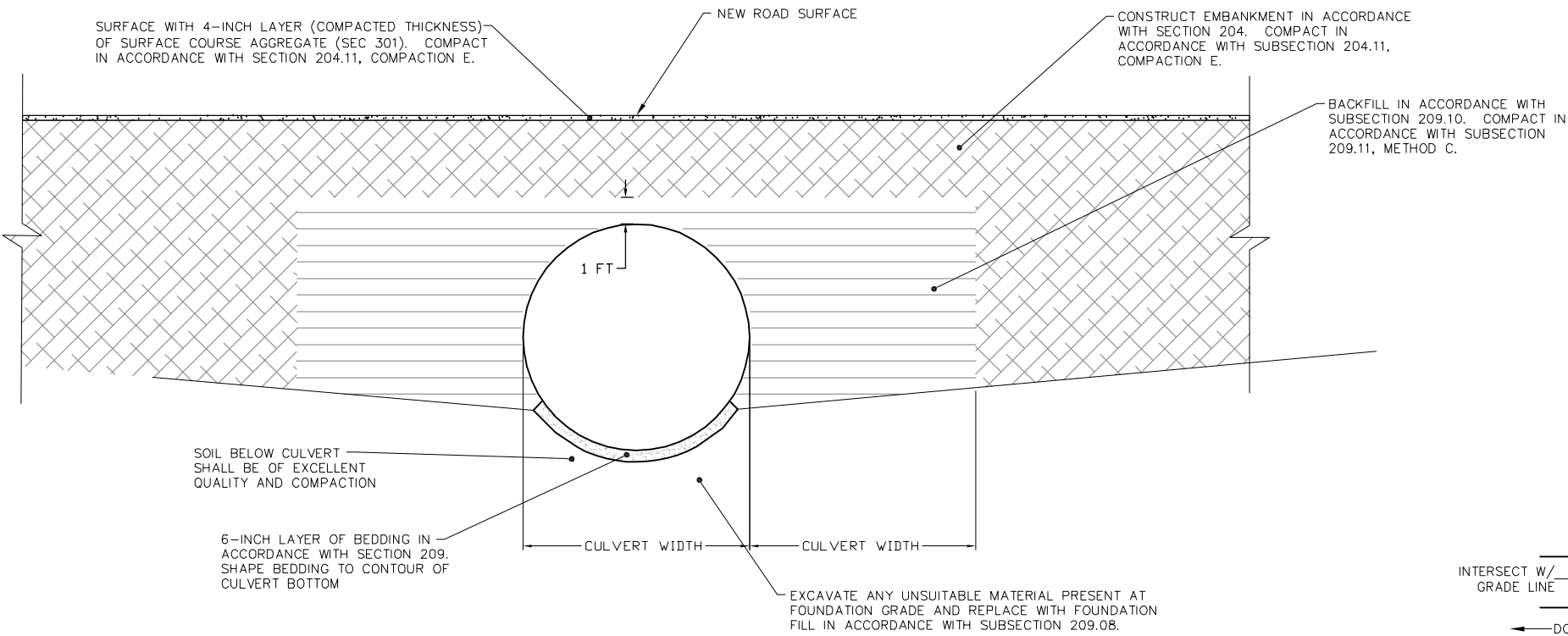


SECTION B-B' CROSS-SECTION THROUGH GRADE CONTROL STRUCTURE  
NOT TO SCALE

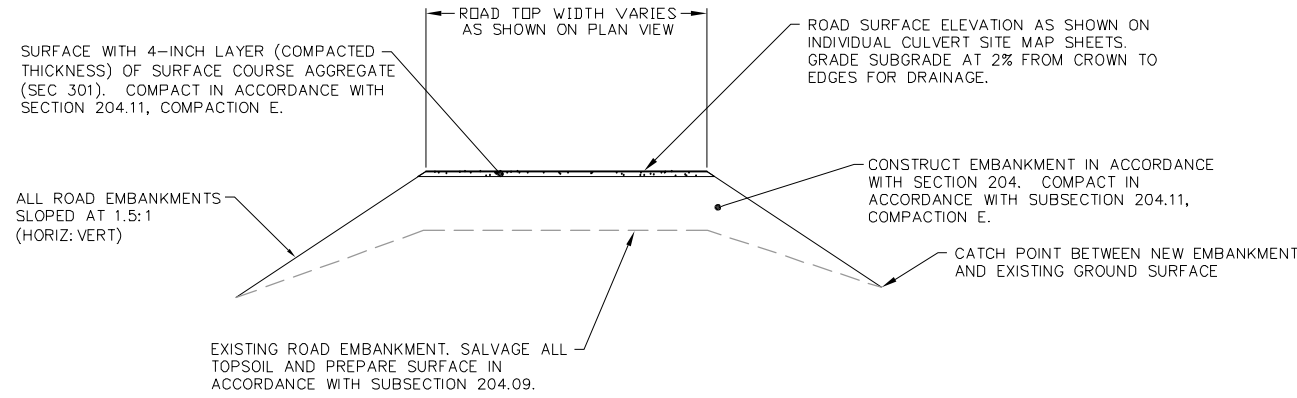


SECTION C-C' THROUGH GRADE CONTROL STRUCTURE AT THALWEG  
NOT TO SCALE

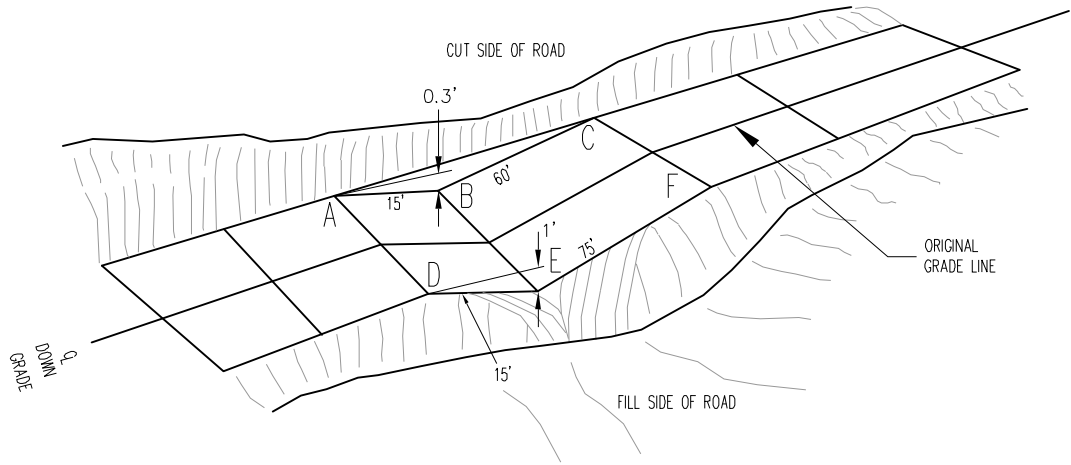
Davis Creek AOP Culvert		
GRADE CONTROL DETAILS		
Drawn by: DW	Date: 06/14/17	Sheet 5 of 6
Revised:	Date:	



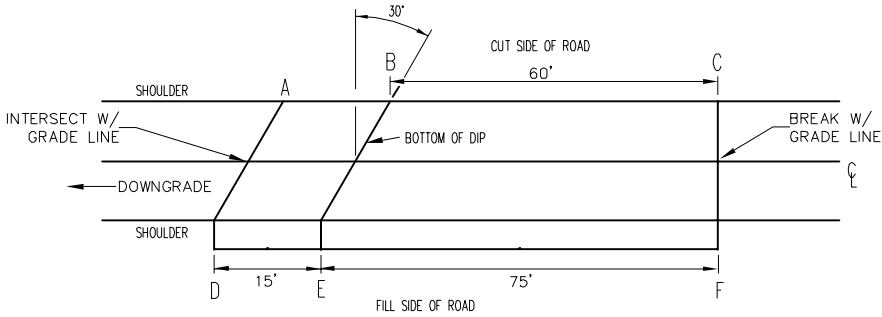
CULVERT INSTALLATION DETAILS  
NOT TO SCALE



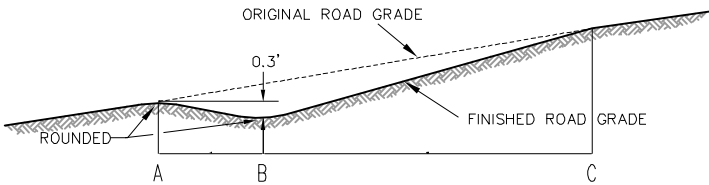
TYPICAL EMBANKMENT CONSTRUCTION  
NOT TO SCALE



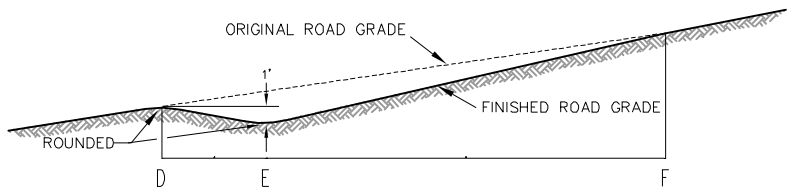
ROLLING DIP DETAILS  
NOT TO SCALE



ROLLING DIP PLAN VIEW  
NOT TO SCALE



ROLLING DIP ON CUT SIDE OF ROAD  
NOT TO SCALE

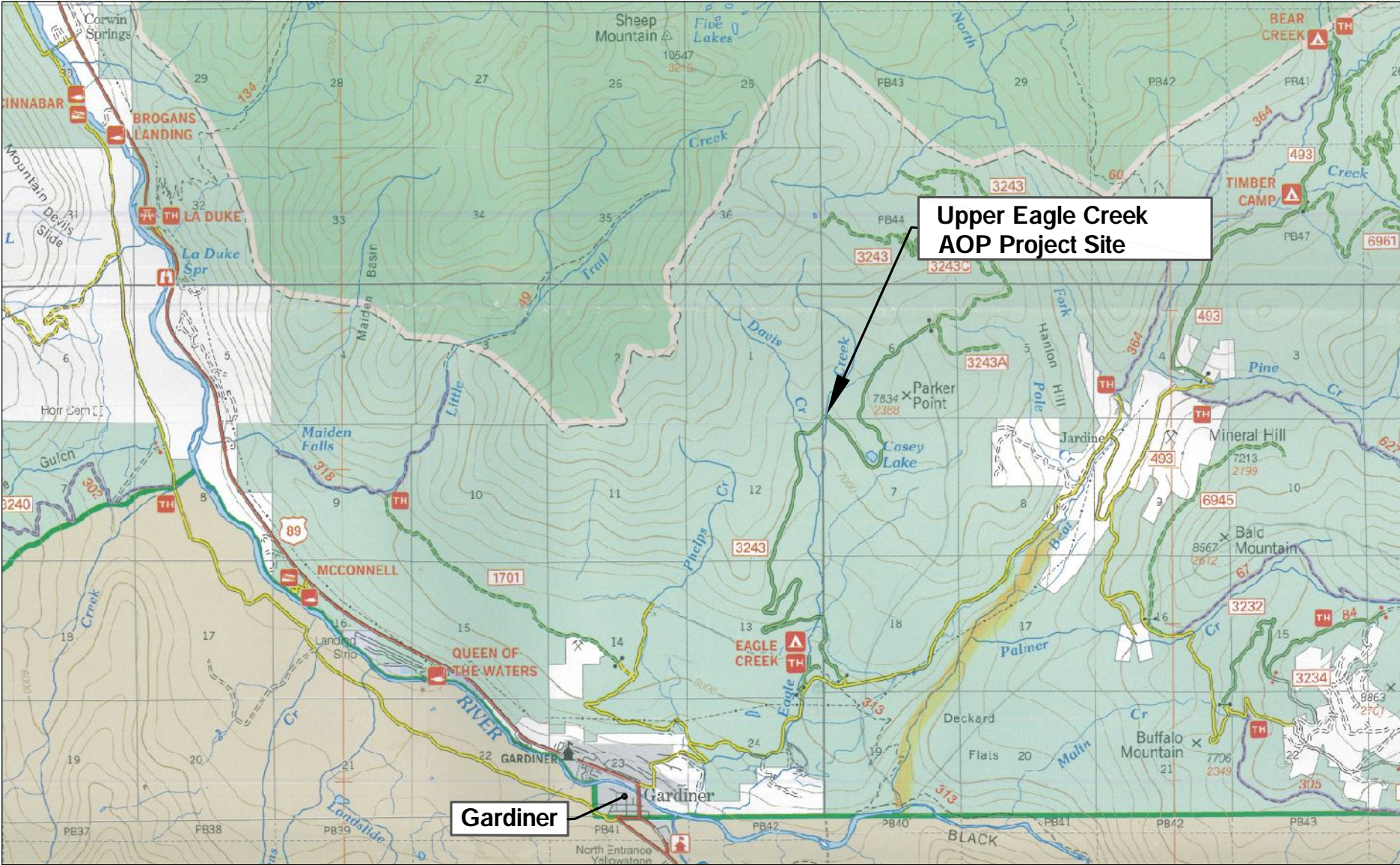
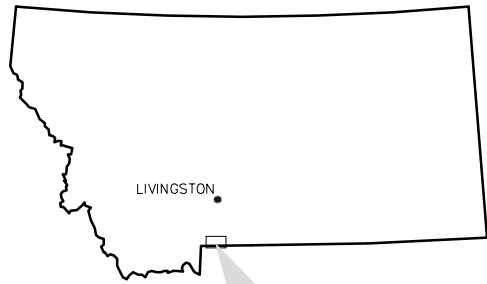


ROLLING DIP ON FILL SIDE OF ROAD  
NOT TO SCALE

Davis Creek AOP Culvert			
ROAD DETAILS			
Drawn by: DW	Date: 06/14/17	Sheet 6 of 6	
Revised: _____	Date: _____		

CONSTRUCTION PLANS FOR  
UPPER EAGLE CREEK  
AQUATIC ORGANISM PASSAGE (AOP) CULVERT

Custer Gallatin National Forest  
Gardiner Ranger District



VICINITY MAP

SHEET INDEX

SHEET	TITLE
1	COVER
2	SITE PLAN AND GENERAL NOTES
3	LONGITUDINAL PROFILE AND CULVERT ENDS
4	STREAMBED DETAILS
5	GRADE CONTROL DETAILS
6	ROAD DETAILS

RECOMMENDED

DESIGN ENGINEER

DATE

DISTRICT RANGER

DATE

APPROVED

I CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED IN ACCORDANCE WITH THE LAND USE PRESCRIPTIONS FOR THE AREA AND WITH SOUND ENGINEERING PRACTICE AND APPROVE IT FOR CONSTRUCTION.

FOREST ENGINEER

DATE

FOREST SUPERVISOR

DATE

GENERAL NOTES

1. GEOTECHNICAL INVESTIGATION. A GEOTECHNICAL INVESTIGATION HAS NOT BEEN CONDUCTED AT THE PROJECT SITE.
2. SPECIFICATIONS, MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03 (U.S. CUSTOMARY UNITS) AND THE SUPPLEMENTAL SPECIFICATIONS INCLUDED IN THE CONTRACT.
3. MATERIAL QUANTITIES. ESTIMATED QUANTITIES ARE PROVIDED FOR INFORMATION ONLY. CONTRACTOR TO VERIFY QUANTITIES.
4. DEWATERING AND EROSION CONTROL. DEWATER AND PROTECT AGAINST SOIL EROSION AND SEDIMENTATION DURING CONSTRUCTION IN ACCORDANCE WITH SECTION 157 AND PROJECT PERMITS. PREPARE AND SUBMIT A DEWATERING AND EROSION CONTROL PLAN TO C.O. FOR APPROVAL. GROUND DISTURBING WORK SHALL NOT COMMENCE UNTIL DEWATERING AND EROSION CONTROL PLAN HAS BEEN APPROVED IN WRITING BY THE C.O.

CONTRACTOR SHOULD ANTICIPATE WATER INFILTRATING INTO EXCAVATIONS AND SHALL REMOVE WATER AS NECESSARY TO COMPLETE THE WORK (INCLUDING BUT NOT LIMITED TO MATERIAL PLACEMENT AND COMPACTION) IN ACCORDANCE WITH ALL CONTRACT REQUIREMENTS.

WORK WITHIN THE STREAM CHANNEL SHALL OCCUR ONLY WHILE THE CHANNEL IS COMPLETELY DEWATERED.

APPROVAL OF THE CONTRACTOR'S DEWATERING AND EROSION CONTROL PLAN BY THE C.O. DOES NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO MEET ALL CONTRACT REQUIREMENTS ASSOCIATED WITH DEWATERING AND EROSION CONTROL. IF THE METHODS IDENTIFIED BY THE CONTRACTOR IN THEIR DEWATERING AND SEDIMENT CONTROL PLAN FAIL TO PROVIDE CONDITIONS UNDER WHICH SPECIFIED CONSTRUCTION RESULTS CAN BE ACHIEVED, OR FAIL TO PROVIDE ENVIRONMENTAL PROTECTION AS PRESCRIBED IN THE CONTRACT OR PROJECT PERMITS, THE CONTRACTOR SHALL RE-EVALUATE AND SUBMIT A REVISED DEWATERING AND EROSION CONTROL PLAN TO THE C.O. PREPARATION OF REVISED PLAN(S) IS INCIDENTAL TO THE WORK.

5. CLEARING AND DISTURBANCE LIMITS. LIMIT ALL DISTURBANCE TO WITHIN THE DESIGNATED DISTURBANCE LIMITS. CLEARING AND DISTURBANCE LIMITS ARE SHOWN ON THE PLANS AND WILL BE STAKED IN THE FIELD BY THE C.O. ADDITIONAL AREAS FOR STORAGE/STOCKPILING SHALL BE SOLELY AT THE DISCRETION OF THE C.O. AND AS APPROVED AND STAKED BY THE C.O.
6. CLEARING AND GRUBBING. CLEARING AND GRUBBING SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 201. SECURE C.O. APPROVAL PRIOR TO FELLING TREES GREATER THAN 8 INCHES IN DIAMETER. LIMB TREES GREATER THAN 6 INCHES IN DIAMETER. DISPOSE OF TREE LIMBS AND SLASH BY SCATTERING ON FINISHED FILL SLOPES AS DIRECTED BY THE C.O. CLEARING AND GRUBBING WORK IS INCLUDED IN PAY ITEM 201-01.

TOPSOIL SHALL BE SALVAGED TO A DEPTH OF 1 FT BELOW THE SURFACE FROM ALL AREAS TO BE DISTURBED BY EXCAVATION, BACKFILL, OR MATERIAL/EQUIPMENT STORAGE/OPERATION AND SHALL BE STOCKPILED SEPARATELY FROM OTHER MATERIALS. FOLLOWING CONSTRUCTION, SALVAGED TOPSOIL SHALL BE SPREAD EVENLY OVER ALL DISTURBED SURFACES TO PROVIDE A MINIMUM 4-IN. DEEP TOPSOIL LAYER. ADJACENT DUFF (LIVE AND DEAD VEGETATION MATERIAL) SHALL BE RAKED ONTO THE DISTURBED AREAS. CONSERVING AND REPLACING TOPSOIL AND PLACING DUFF, TREES, AND SLASH IS INCLUDED IN PAY ITEM 201-01.

SALVAGE CLEAN EXISTING SURFACE COURSE AGGREGATE FROM ALL AREAS TO BE DISTURBED AND STOCKPILE FOR RE-APPLICATION TO ROAD SURFACE. RE-APPLY ONLY GRAVEL THAT HAS BEEN APPROVED FOR USE BY THE C.O. CONSERVING AND REPLACING SURFACE COURSE AGGREGATE IS INCLUDED IN PAY ITEM 204-01.

7. CONTROL POINTS. EXISTING CONTROL POINTS ARE SHOWN ON THE DRAWINGS. CONTRACTOR SHALL LOCATE LAYOUT POINTS IN ACCORDANCE WITH SECTION 152. SECURE C.O. APPROVAL OF SURVEYED LAYOUT POINTS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
8. TOLERANCES. CONTROL POINT TOLERANCES SHALL BE AS SHOWN IN SECTION 152. CONSTRUCTION TOLERANCES (X,Y,Z) SHALL BE AS FOLLOWS:

+/- 0.5 FT IN THE HORIZONTAL (X,Y) PLANE

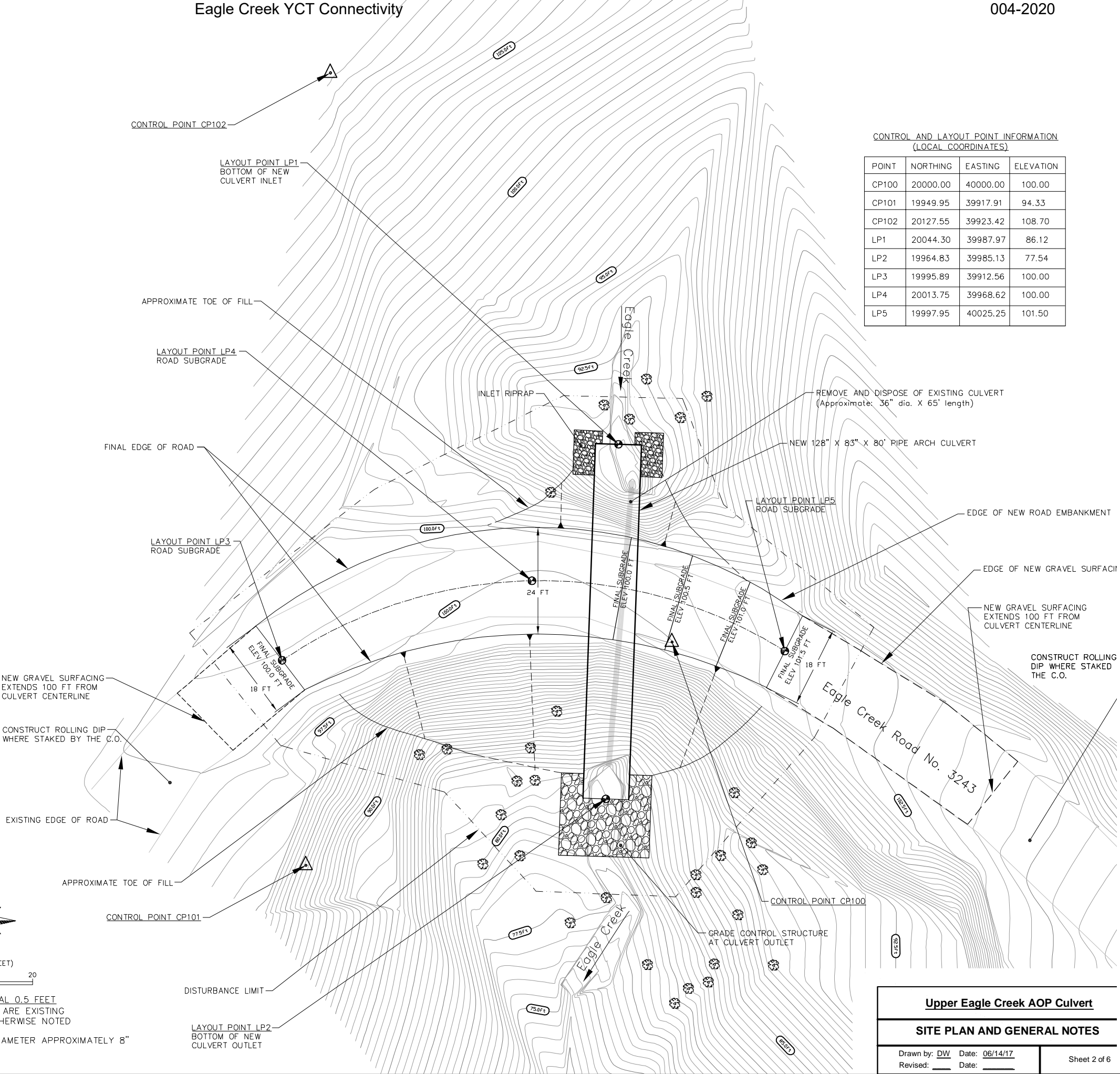
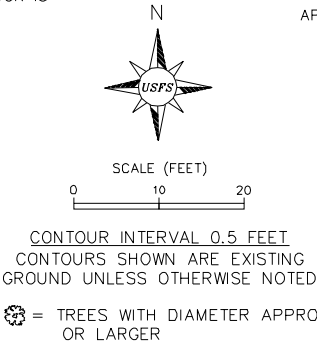
+/- 0.1 FT VERTICAL (Z)

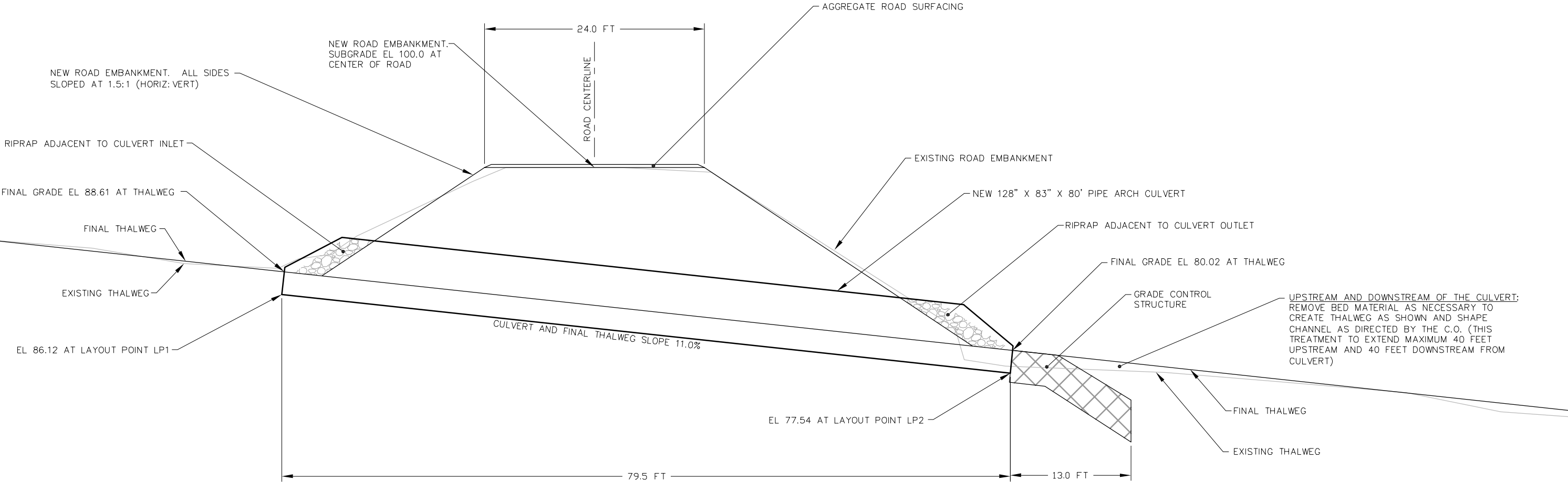
DIMENSIONS (E.G., LENGTH, WIDTH, THICKNESS) SHALL BE AS SHOWN ON THE PLANS.

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- THE CONTRACTOR SHALL SUBMIT AN EXCAVATION PLAN TO THE C.O. FOR APPROVAL. PLAN SHALL INCLUDE DRAWINGS AND WRITTEN OUTLINE ILLUSTRATING AND DESCRIBING PROPOSED EXCAVATION LIMITS, METHODS, EQUIPMENT, SHORING, LOCATION OF STOCKPILES, AND ESTIMATED QUANTITIES AND SHALL COMPLY WITH OSHA EXCAVATION SOIL TYPING AND REQUIREMENTS.

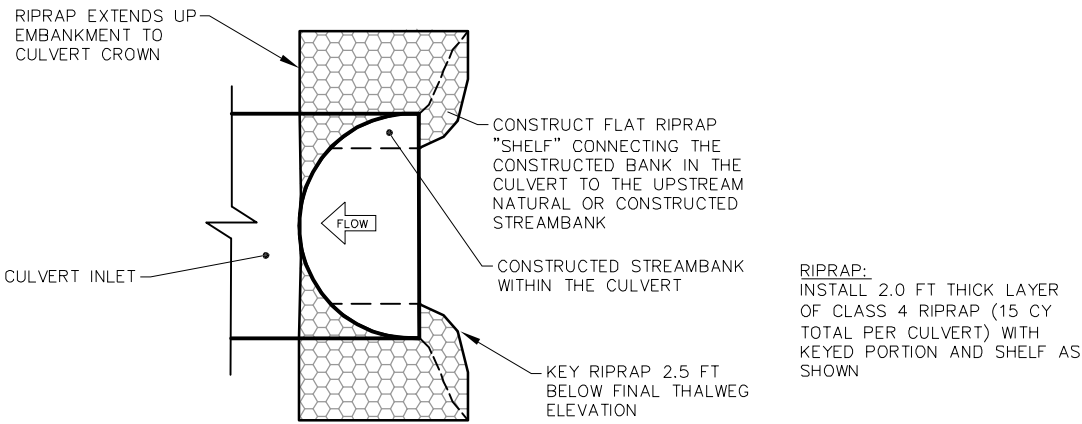
STRUCTURE EXCAVATION QUANTITY SHOWN IS FOR INFORMATIONAL PURPOSES ONLY AND IS BASED ON MAXIMUM ALLOWABLE SLOPE ON EXCAVATION WALLS OF 1.5:1 (HORIZONTAL:VERTICAL) . CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES BASED ON THEIR OWN EXCAVATION PLANS.

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12. THALWEG. THE THALWEG IS DEFINED AS THE LOWEST POINT IN THE STREAM CHANNEL CROSS-SECTION.
13. ESTIMATED QUANTITIES. ESTIMATED QUANTITIES ARE SHOWN ON THE BID SCHEDULE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF QUANTITY ESTIMATES.

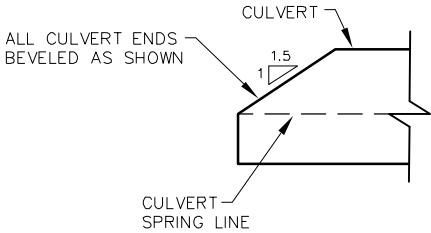




LONGITUDINAL SECTION THROUGH CULVERT  
NOT TO SCALE

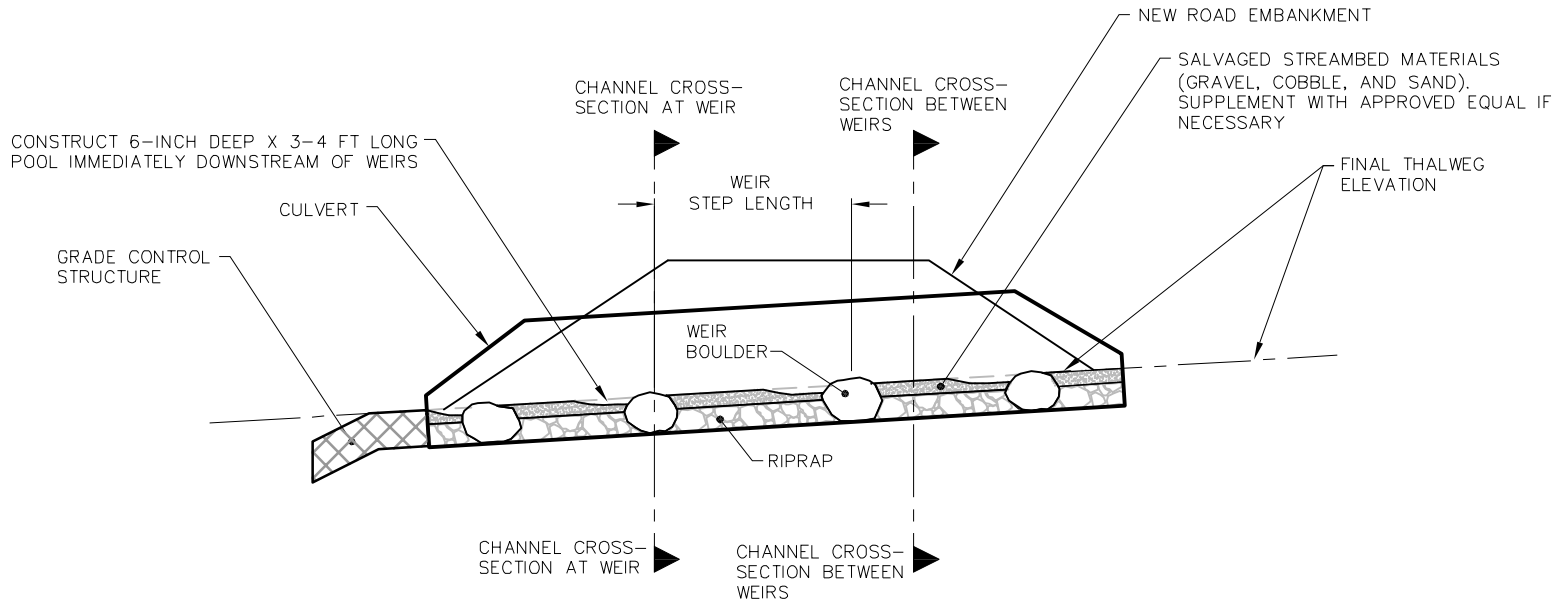


CULVERT INLET RIPRAP PLAN VIEW  
NOT TO SCALE

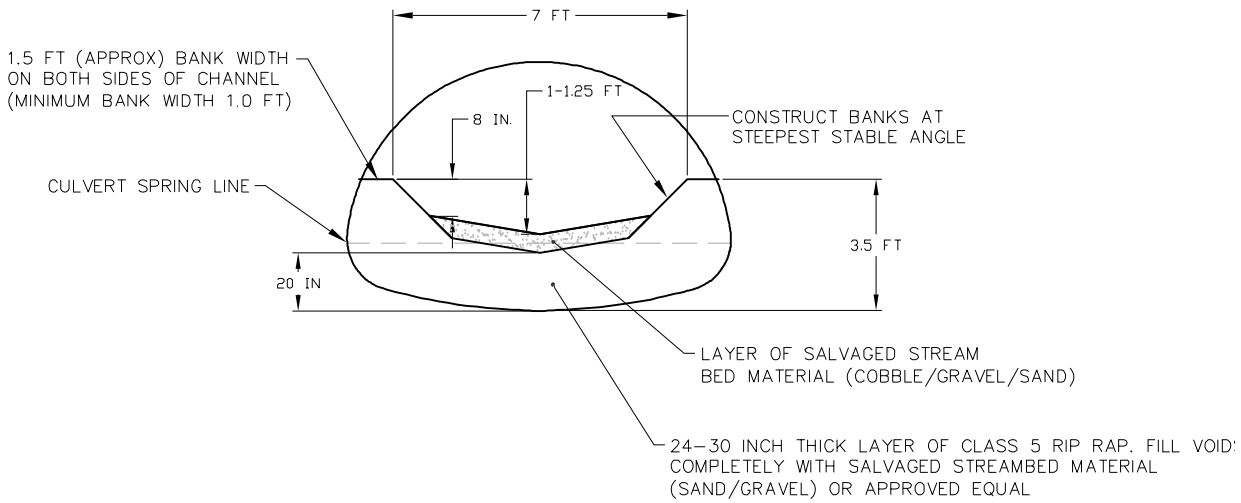


DETAIL OF CULVERT BEVELED END  
NOT TO SCALE

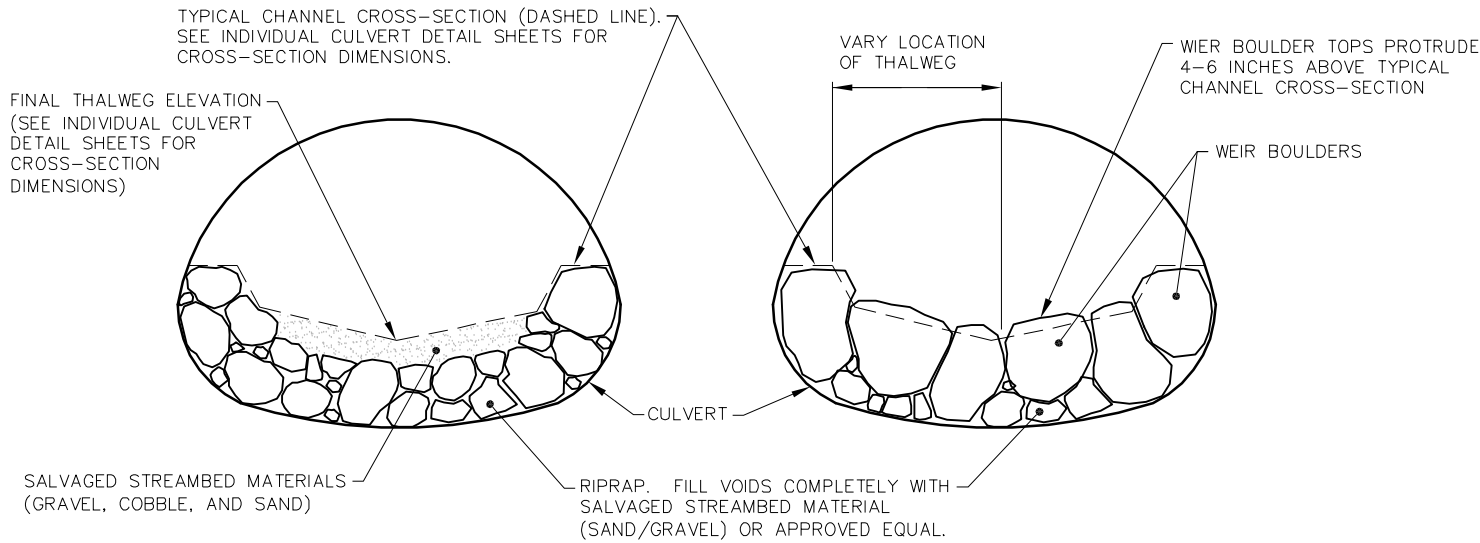
Upper Eagle Creek AOP Culvert		
LONGITUDINAL PROFILE AND CULVERT EN		
Drawn by: DW	Date: 06/14/17	Sheet 3 of 6
Revised:	Date:	



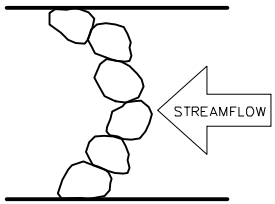
TYPICAL LONGITUDINAL SECTION THROUGH CULVERTS  
NOT TO SCALE



CHANNEL CROSS-SECTION DIMENSIONS AND MATERIALS WITHIN CULVERT  
NOT TO SCALE



CONSTRUCTED CHANNEL CROSS-SECTIONS INSIDE CULVERTS  
NOT TO SCALE



TYPICAL PLAN VIEW OF WEIR  
NOT TO SCALE

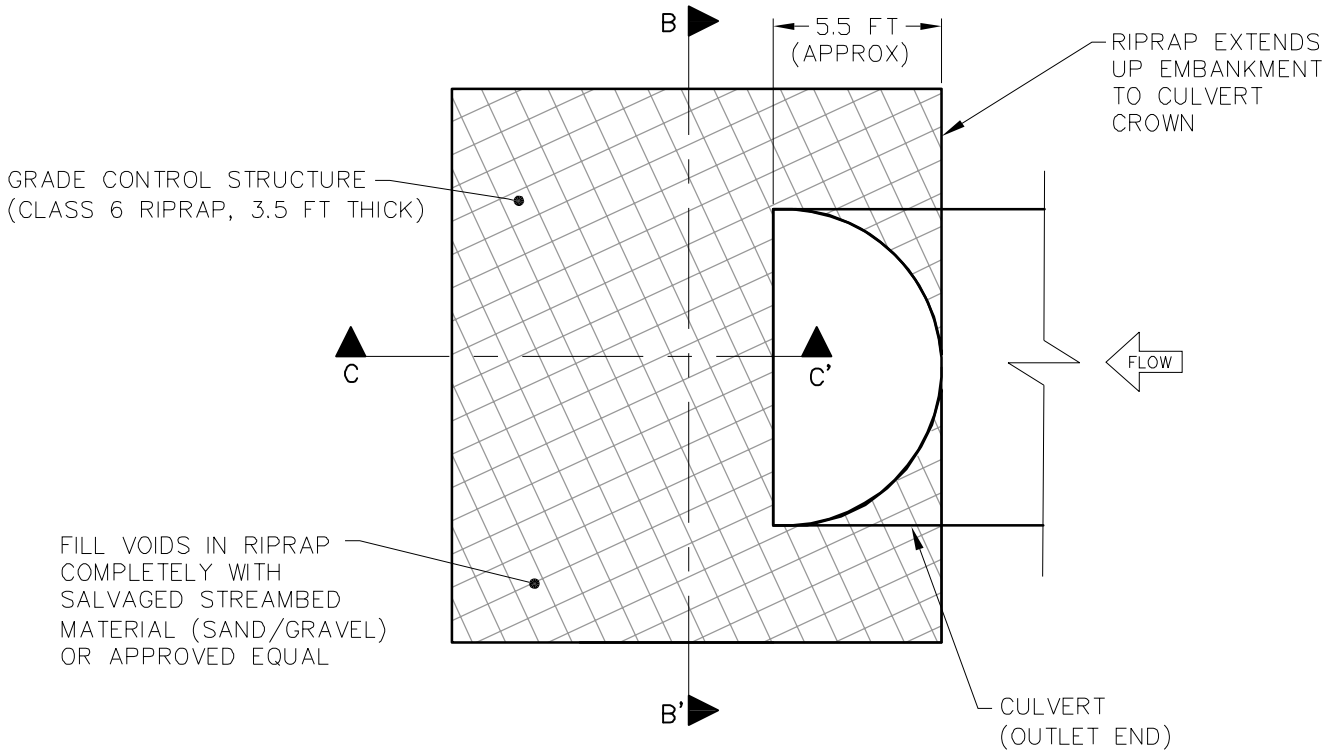
CHANNEL TOP WIDTH, WEIR BOULDER SIZE,  
GRADE CONTROL RIPRAP SIZE, AND STEP LENGTH

CHANNEL TOP WIDTH	7 FT
RIPRAP INSIDE CULVERT	CLASS 5
WEIR BOULDER SIZE*	34-40 IN.*
GRADE CONTROL RIPRAP	CLASS 6
STEP LENGTH RANGE	8-10 FT.
STEP LENGTH AVERAGE	9 FT.

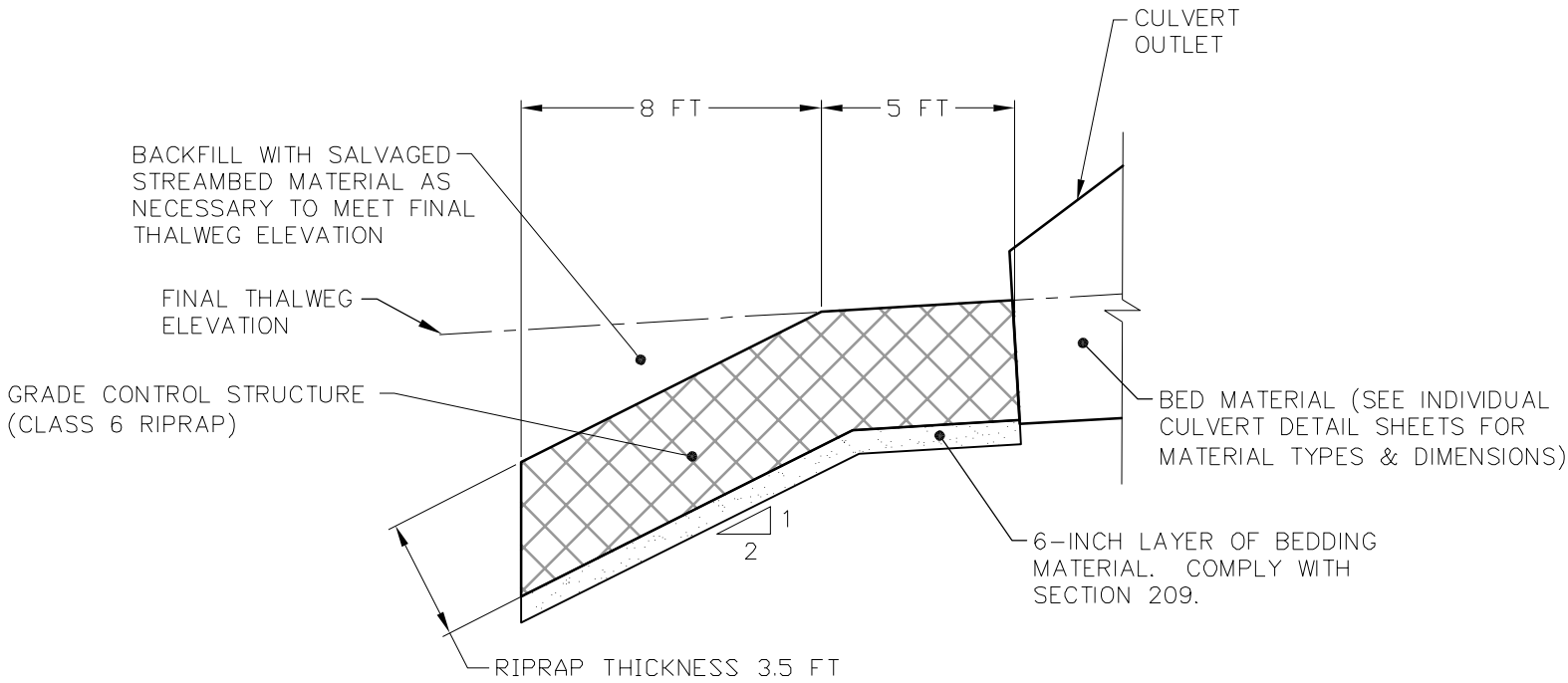
\*THE SIZE SHOWN IS THE "INTERMEDIATE DIMENSION" AS DEFINED IN SECTION 101

NOTE: VARY STEP LENGTH WITHIN RANGE SHOWN. ACHIEVE OVERALL AVERAGE AS SHOWN.

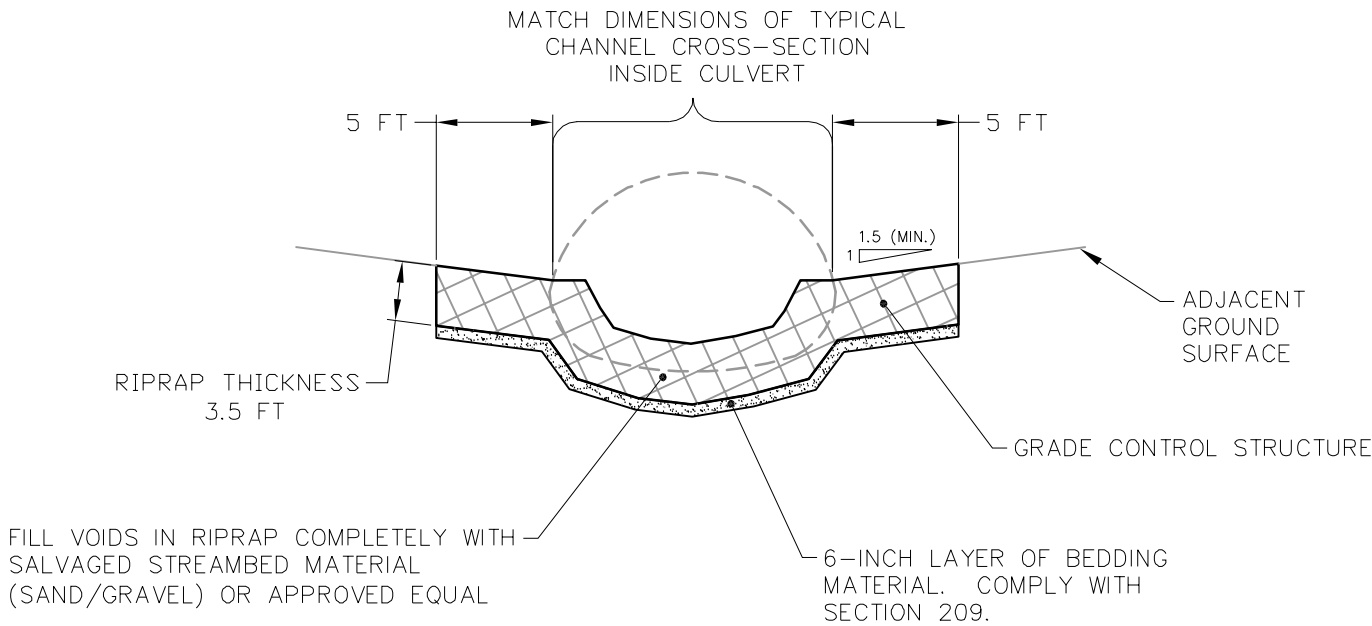
MATERIAL SIZES AND WEIR STEP LENGTH  
NOT TO SCALE



GRADE CONTROL STRUCTURE PLAN VIEW  
NOT TO SCALE

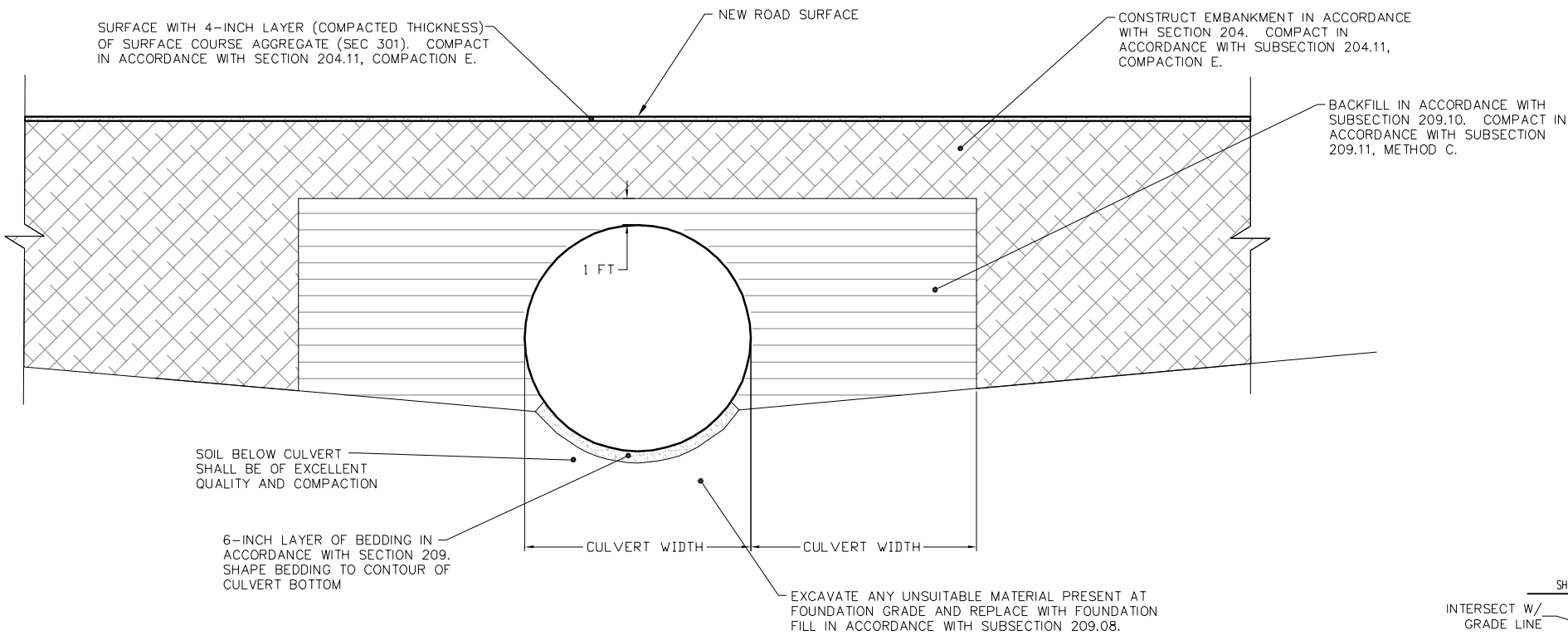


SECTION C-C' THROUGH GRADE CONTROL STRUCTURE AT THALWEG  
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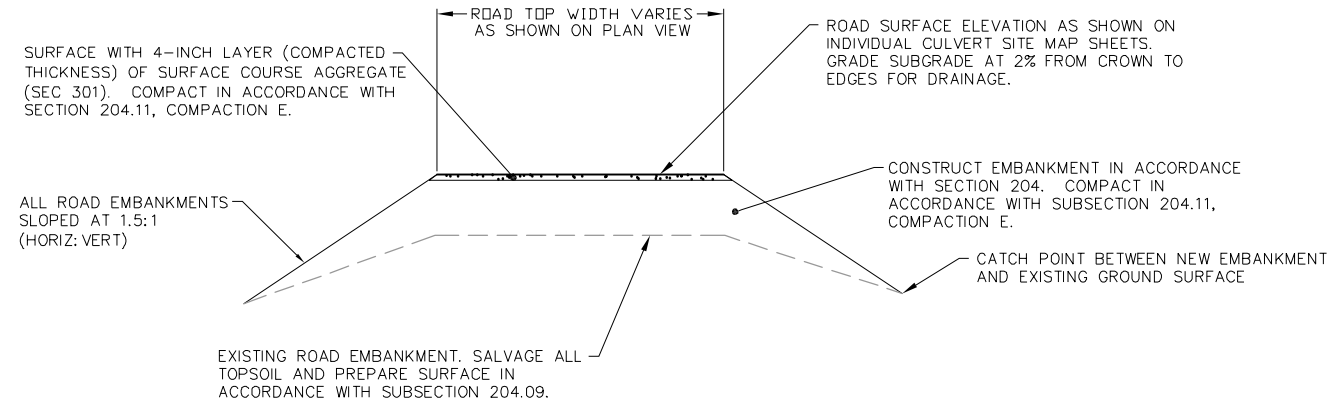


SECTION B-B' CROSS-SECTION THROUGH GRADE CONTROL STRUCTURE  
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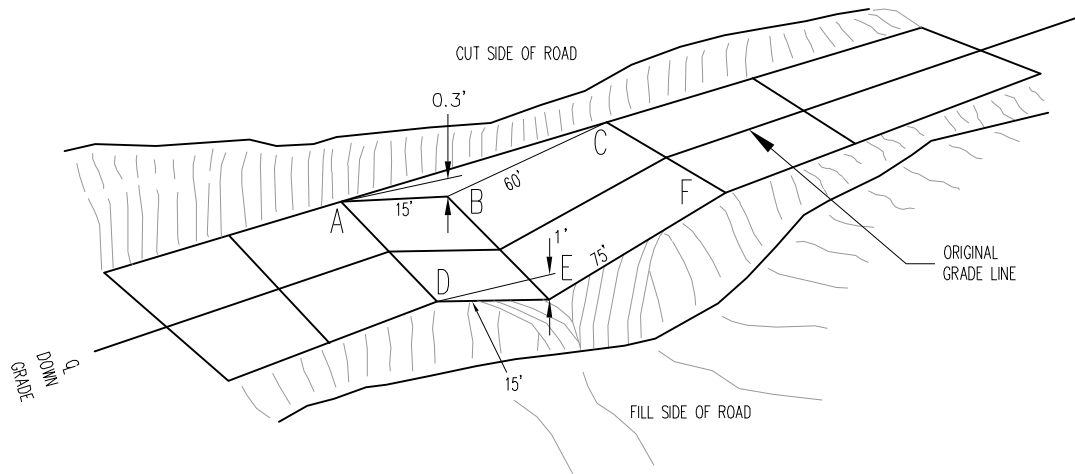
Upper Eagle Creek AOP Culvert			
GRADE CONTROL DETAILS			
Drawn by: DW	Date: 06/14/17		
Revised:	Date:	Sheet 5 of 6	



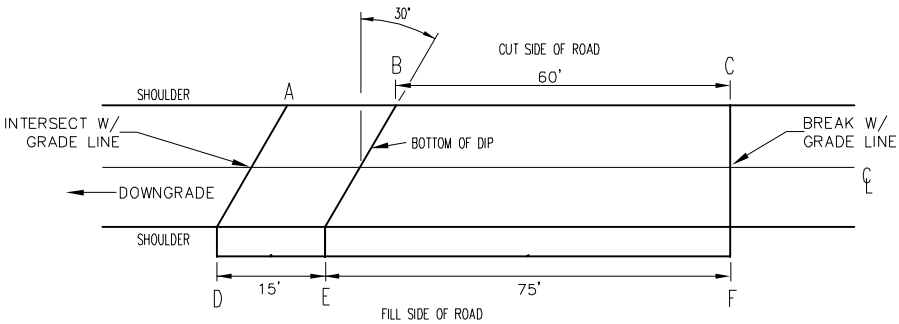
CULVERT INSTALLATION DETAILS  
NOT TO SCALE



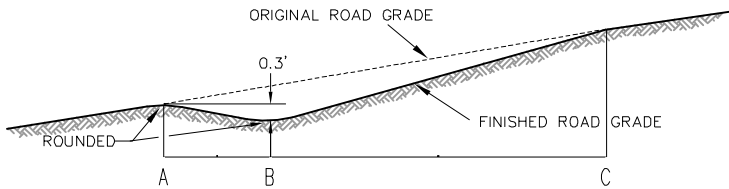
TYPICAL EMBANKMENT CONSTRUCTION  
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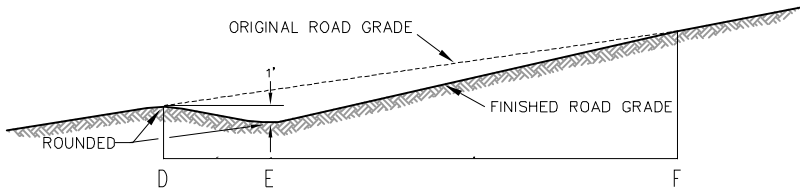
ROLLING DIP DETAILS  
NOT TO SCALE



ROLLING DIP PLAN VIEW  
NOT TO SCALE



ROLLING DIP ON CUT SIDE OF ROAD  
NOT TO SCALE



ROLLING DIP ON FILL SIDE OF ROAD  
NOT TO SCALE

Upper Eagle Creek AOP Culvert			
ROAD DETAILS			
Drawn by: DW	Date: 06/14/17	Sheet 6 of 6	
Revised:	Date:		

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FWP.MT.GOV

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THE **OUTSIDE** IS IN US ALL.

1354 Highway 10 West, Livingston MT 59047

November 22, 2019

To Whom It May Concern:

I have worked for 15 years on the conservation of Yellowstone Cutthroat Trout in Yellowstone River Basin and I am pleased to provide this letter of support for the Custer Gallatin National Forest proposal to Future Fisheries requesting funding for fish passage in Eagle Creek. I am aware that the requested funds will restore passage on Eagle Creek and will increase the connectivity of Yellowstone Cutthroat Trout within this stream by 1.5 miles. This is one more step in conserving the species in a priority conservation area.

Montana Fish, Wildlife & Parks is responsible for the management of fisheries in the Yellowstone River Basin and has a special interest in Yellowstone Cutthroat Trout conservation in the basin. The proposed work is part of a larger conservation effort in the basin that in conjunction with replacement of a culvert on Davis Creek will provide a total of 4.7 miles of connected habitat that will be protected from Brook Trout invasion and greatly reduce the risk of losing Yellowstone Cutthroat Trout in this part of the basin.

I strongly encourage Future Fisheries to join in supporting this valuable project by providing the requested funds for replacement of the culvert.

If I can provide more information or answer any questions, please feel free to contact me.

Sincerely,

Scott Opitz  
Fisheries Management Biologist-Livingston  
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